FEDERAL ROLE IN AVIATION
(1958)

HEARINGS

BEFORE A

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COMMITTEE ON
GOVERNMENT OPERATIONS
HOUSE OF REPRESENTATIVES

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FEDERAL ROLE IN AVIATION
(1958)

THURSDAY, MAY 22, 1958

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON LEGAL AND MONETARY AFFAIRS
OF THE COMMITTEE ON GOVERNMENT OPERATIONS,
Washington, D. C.

The subcommittee met, pursuant to call, at 2:10 p. m., in the caucus room, New House Office Building, Representative Joe M. Kilgore presiding.

Present: Representatives Joe M. Kilgore, Martha W. Griffiths, Porter Hardy, Jr., George Meader, and William E. Minshall.

Also present: Jerome S. Plapinger, counsel; Curtis E. Johnson, staff administrator; Eric Weinmann, associate counsel; and Elizabeth D. Heater, clerk.

Mr. KILGORE. Gentlemen, we are sorry to be late. We had a quorum call before the House.

Two years ago, in 1956, this subcommittee conducted extensive hearings on the Federal role in aviation. During those hearings, considerable emphasis was placed upon the increasing hazards of midair collisions in air operations. In its report, the subcommittee observed that the Harding committee report to the president, in December 1955, indicated failure on the part of the Federal Government to plan for economical use of airspace.

Equally important is the Government failure to discharge responsibilities which the United States alone holds in the field of air transportation. Midpoint in our 1956 hearings, the tragic crash between two commercial airlines occurred in the Grand Canyon in which 128 persons were killed. Since that tragic crash 2 years ago, another midair collision occurred in Nevada only a month ago, when a military jet collided with a large commercial plane. In this accident, 49 people were killed. It appears that CAA had no knowledge of the presence of that military plane in the Federal airways at that time.

As a result of the Nevada crash, we were informed that CAA and the Air Force were developing procedures to avoid repetition of similar accidents. However, 2 days ago, on May 20, a Capital Airline plane proceeding to Baltimore, flying under instrument flight rules and under control of the CAA, was struck by a National Guard jet. Twelve people lost their lives in the resulting collision.

The conferences between CAA and the Air Force prompted by the accident in Nevada were to result in decision within 60 days. The subcommittee believes it appropriate to inquire whether the situation was not of sufficient urgency to demand an emergency decision, rather than one to be deliberated over for 2 months.

The subcommittee took note in its report 2 years ago that Mr. Harding had reported to the President that—

> The increasing risks of midair collisions have already reached critical proportions as a result of outmoded traffic-control facilities.

According to the committee's present information, the navigational aids known as VORTAC were agreed on by both civilian and military agencies in the Government several weeks after the conclusion of the subcommittee's 1956 hearings—this after approximately 6 years of delay. At that time the subcommittee also recommended that the proposed 5-year airways modernization plan, to include among other things a radar surveillance system, be accelerated to 3 years.

The most recent accident in Maryland apparently occurred within the range of CAA traffic control center in Washington. The subcommittee wonders: Was the close proximity of the two planes involved in the recent crash unobserved by CAA traffic controllers?

In sum, the subcommittee is gravely concerned with the increasing frequency of midair accidents and the apaprently faltering steps being taken to avoid them. Certainly a very serious question is raised as to whether this problem should be further aggravated by the introduction of commercial jet liners which will travel at speeds in excess of 500 miles per hour.

While the subcommittee is concerned with the accident which has recently occurred, we propose to conduct a full-scale inquiry into the Federal Government's role—and this includes the role of the Congress as well as the role of the executive branch—in the promotion of air safety and aviation.

This past Tuesday evening, the President assured us that, in the field of aviation, plans are well advanced for the jet age. Our subcommittee is here inquiring into the extent and nature of these plans.

Subcommittee staff studies have been under way for several months on these matters. Our immediate interest lies in the prompt application of an air traffic control system which will be reasonably commensurate with the demands of present air operations. If such a system cannot be effectuated now, it may be necessary to limit air operations to the degree necessary to create reasonable safety in the skies.

The time for temporizing is over. We believe that corrective action can be—and must be—taken immediately.

The first witness the subcommittee would like to hear from today is Lt. Col. Edwin Warfield, chief of staff, who is accompanied by Maj. James Considine, deputy chief of staff, and Lt. Col. Victor F. Kilkowski, commanding officer, 104th Fighter Interceptor Squadron, are representing the Maryland Air National Guard.

STATEMENT OF LT. COL. EDWIN WARFIELD, CHIEF OF STAFF, MARYLAND AIR NATIONAL GUARD; ACCOMPANIED BY MAJ. JAMES I. CONSIDINE, DEPUTY CHIEF OF STAFF; LT. COL. VICTOR F. KILKOWSKI, COMMANDING OFFICER, 104TH FIGHTER INTERCEPTOR SQUADRON; MAJ. JOSEPH J. MAISCH, JR., OPERATIONS OFFICER; CLAYTON DIETRICH, MARYLAND MILITARY DEPARTMENT; AND COL. JACK D. BLANCHARD, CHIEF OF OPERATIONS, AIR NATIONAL GUARD

Colonel WARFIELD. Mr. Chairman, with your permission I will introduce Mr. Clayton Dietrich, who is representing the Maryland Military Department.

Mr. KILGORE. Is Colonel Blanchard here?

Colonel BLANCHARD. Yes, sir, representing and speaking for General Wilson, who is at another hearing and is unable to be here.

Mr. KILGORE. You are Chief of Operations of the Air National Guard?

Colonel BLANCHARD. Yes, sir.

Colonel WARFIELD. Mr. Chairman, with your permission, I would like to present a short prepared statement.

My name is Edwin Warfield III, Chief of Staff, Maryland Air National Guard. My duties are to aid and assist the adjutant general, State of Maryland, in the administration and supervision of the Air Guard units in the State of Maryland under regulations, policies, and procedures as prescribed by the National Guard Bureau and the United States Air Force.

I was a combat Air Force fighter pilot on Iwo Jima in World War II. I presently fly F–86H jet fighter aircraft with the 104th Fighter-Interceptor Squadron, Maryland Air National Guard.

I have with me Lt. Col. Victor F. Kilkowski, commanding officer of the 104th Fighter Interceptor Squadron; Maj. James I. Considine, Deputy Chief of Staff, Maryland Air National Guard; and Maj. Joseph J. Maisch, Jr., the full-time operations officer of the 104th. Mr. Clayton Dietrich, at the request of the Military District, State of Maryland, is here representing the State of Maryland.

At your request, I come prepared to answer your questions regarding 104th jet operations.

I would like to emphasize that the Air Guard units in the State of Maryland operate under strict regulations laid down by the United States Air Force, the Civil Aeronautics Administration, and Air National Guard regulations.

The quickest way for Maryland Air National Guard pilots to be eliminated from the unit is to violate any of these regulations.

The second quickest way is not to maintain flying proficiency.

A thorough and impartial board, comprised of the Civil Aeronautics Board, the United States Air Force, and the Air National Guard personnel, is at this time conducting a fullscale investigation

of the unfortunate collision between the jet and the Capital airliner. We are not here to prejudge the findings of this investigation, which will take a long time, but will be thorough. I am here to answer any questions that you gentlemen wish to ask me pertaining to this accident, or to any phases of the Air National Guard operation that I know about.

And any comments that I have about the accident are from the sole surviving pilot, a Capt. Julius McCoy, who is in the Public Health Service Hospital at Baltimore suffering critically from shock and burns.

I have talked to him several times.

I thank you, sir.

Mr. PLAPINGER. Colonel, am I correct in my understanding that Captain McCoy was a member of the 104th Fighter-Interceptor Squadron?

Colonel WARFIELD. That is correct. He was not only a member; he was the full-time maintenance officer in charge of maintaining 25 jet fighters.

Mr. PLAPINGER. Where is the 104th Fighter-Interceptor Squadron based?

Colonel WARFIELD. It is based at the Martin Airport, a private company, approximately 5 miles east of Baltimore.

Mr. PLAPINGER. And who directs the traffic operations at that airport?

Colonel WARFIELD. They are directed by tower operators—and I would like your permission to doublecheck whom they are licensed by. The are Martin Co. employees, licensed by the Civil Aeronautics Administration.

Mr. PLAPINGER. Are there any other fighter-interceptor squadrons in the Maryland Air National Guard?

Colonel WARFIELD. There are not, sir. There is a twin-engine flying-boat unit located at Harbor Field.

Mr. PLAPINGER. Where is the Glenn Martin Airport? Is that the correct title?

Colonel WARFIELD. They call it the Martin Airport. It belongs to Glenn L. Martin Co.

Mr. PLAPINGER. How far from Friendship is the Martin Airport?

Colonel WARFIELD. I have a map. I have not scaled it, but my estimate is that it is about 8 miles, in my opinion.

Mr. PLAPINGER. What is the level of flying experience of the personnel of this squadron?

Colonel WARFIELD. If I can ask your permission to wait a second, I have some facts. The average total time per pilot, for 37 pilots, is 2,023 hours.

Mr. PLAPINGER. Do I gather correctly, or can I assume correctly from that, that this squadron does not train pilots from scratch, but they have pilot personnel previously qualified?

Colonel WARFIELD. You are correct, sir. We have two sources. One is to send individual cadet applicants to the United States Air Force Flying Training Schools to go through Regular Air Force jet pilot training. At the end of 2 years, we get them back. Another continuing excellent source is getting Regular Air Force pilots who return to their home town to join the unit after their tour of duty is up with the Air Force.

Mr. PLAPINGER. Does all the flying equipment of the 104th Fighter-Interceptor Squadron consist of jetplanes?

Colonel WARFIELD. I will have to check exactly the total number of the planes. We have 26 F–86 jet fighters; we have 2 T–33 jet trainers, of which 1 just crashed. We have one propeller-driven C–47 transport.

Mr. PLAPINGER. Now, is the mission of the squadron to train, or is it a fighter-interceptor squadron ready to be called into action at any time?

Colonel WARFIELD. I would prefer not to use the word "training." It is used to maintain flying proficiency or participate in the active air defense of Baltimore on call from the closest Air Force radar station.

Mr. PLAPINGER. So that it is ready to be called into action at any time?

Colonel WARFIELD. It is part of the 85th Air Division augmentation forces, and it is ready to be called to duty at any time.

Mr. PLAPINGER. Now, how many operations do you have weekly in the squadron, Colonel?

Colonel WARFIELD. I am going to let the squadron commander give you a breakdown on that. I will turn it over to Colonel Kilkowski, with your permission.

Mr. PLAPINGER. Go right ahead.

Colonel KILKOWSKI. Gentlemen, I am not prepared to give an exact number of the flights at this time.

Mr. PLAPINGER. Approximately, Colonel. You can supply the exact figures for the record at a later date.

Colonel KILKOWSKI. It would be approximately 100 hours per week.

Mr. PLAPINGER. One hundred hours per week?

Colonel KILKOWSKI. This is an approximate figure, now.

Mr. PLAPINGER. What proportion of this takes place on the weekend, and what takes place during the weekdays?

Colonel KILKOWSKI. I would say approximately 50 percent. Again, I wish to state these are approximate figures. We have not made an evaluation of this. If you wish, I could get exact figures and present them to the committee.

Mr. PLAPINGER. You can submit them for the record.

(The following information was furnished for inclusion in the record:)

Question. How many operations do you have weekly in the squadron?

Answer. As of the 1st of January through May 22, 1958, there has been an average of 75 flights per week.

Question. What proportion of this takes place on the weekend, and what proportion takes place on the weekdays?

Answer. As of January 1 through May 22, 1958, 49 percent of the flights were made on the weekends and 51 percent during the weekdays (Saturday and Sunday being considered as weekends).

Mr. PLAPINGER. Now, when these planes are engaged in training proficiency, or, if you will, flying-proficiency missions, what types of clearances do these planes obtain?

Colonel WARFIELD. Normally, on a clear day, they take off on what is known as a local flight clearance, take off and land at the Martin strip, and fly in the local area, which is designated as a 100-mile radius of the Martin airstrip.

Mr. PLAPINGER. Local clearance means a 100-mile radius of the Martin airstrip?

Colonel WARFIELD. That is correct.

Mr. PLAPINGER. At the time that this accident occurred, was Captain McCoy's plane within the 100-mile radius?

Colonel WARFIELD. Captain McCoy's plane was in the 100-mile radius. He was south of Frederick, which is approximately 60 miles from Baltimore.

Mr. PLAPINGER. Is there any question about Captain McCoy violating his clearance in any respect?

Colonel WARFIELD. He was on a VFR clearance, and we have searched the regulations, and, to our knowledge, he has not violated any CAA or Air Force regulations, which are covered by 60–16, in taking the flight. And the Air Force does have regulations which are as strict and slightly stricter than CAA.

Mr. HARDY. Colonel, would that mean that there is a deficiency in existing regulations?

Colonel WARFIELD. Mr. Hardy, I am not qualified to criticize the CAA.

Mr. HARDY. I did not ask you to criticize. I do not know that one has to be an expert to pass judgment on the adequacy of the regulations to prevent the accident.

I understood it to be your testimony that there was no violation of any existing regulation.

Colonel WARFIELD. To our knowledge, there was no violation. However, the board is conducting an inquiry to determine if there was.

To our knowledge—and none of us were there, and all we can do is talk to the injured jet pilot.

Mr. HARDY. All I have to say is that if there was no violation of regulations, then in my mind there is a need for some improvements in the regulations. Because I do not think any of us wants to be risking the lives of our pilots or the lives of people on commercial airlines.

Mr. PLAPINGER. The press reports, Colonel Warfield, referred to the fact Captain McCoy had a passenger in the plane. Is this customary?

Colonel WARFIELD. It is not customary to take anybody but Air National Guard pilot personnel in the back set of the jets.

This boy was an Army National Guard private who, under regulations, being in the military, was permitted to take a ride, space being available. The back seat was not filled that day. The flight was planned ahead of time; he reported, was briefed for approxiamtely an hour—I would like to correct that; for approximately 40 minutes.

Mr. PLAPINGER. Is there any procedure——

Colonel WARFIELD. And the reason for taking him up—I hate to interrupt—was we occasionally—I think 3 times in the last 6 months—have taken up potential pilot candidates to see if they might be adapted to send away to flying school to train as a jet pilot to come back to our unit.

Mr. PLAPINGER. Is there any procedure for exchange of information with respect to what commercial planes are in the vicinity when the squadron conducts its flying operations, Colonel?

Colonel WARFIELD. The procedure is that the pilot of a given aircraft, on a clear day, is required to keep a constant search ahead, behind, above, and below; and to clear himself and keep a proper clearance from other aircraft. But the situation would fluctuate with so many different types of planes in the air at a given moment, that it would be difficult for any one agency to keep constantly reporting to each pilot the exact location of other planes.

So it is very much like driving a car; it is the law of the road that you maintain your proper clearance.

This is when the weather is good.

Mr. HARDY. Colonel, is a pilot on one of these training flights supposed to know when he gets into a commercial airlane?

Colonel WARFIELD. Mr. Hardy, may I restate your question and see if I have it correctly: Does a pilot know when he gets in a commercial airlane?

Mr. HARDY. Or is he supposed to know?

Colonel WARFIELD. Yes, sir.

Mr. HARDY. Is there any special precaution taken, or are there any specific instructions with respect to the exercise of particular care while in a commercial airlane?

Colonel WARFIELD. Yes, sir, there is a regulation to cover it. Here it is. This is Air Force Regulation 60–16, section 3 (a):

> During the time an IFR instrument flight is operating in VFR weather conditions, it is the direct responsibility of the pilot to avoid other aircraft, since VFR flights may be operating in the same area without the knowledge of ATC—

which refers to air traffic control.

And I would like to correct this. This is an air traffic clearance. The 60–16 are the general regulations. This is an air traffic clearance from Supplementary Flight Document, United States Air Force.

Mr. HARDY. That still does not indicate to you—what you have read—any reasonable assurance that there is going to be extra precaution or that there is adequate precaution taken because of the extra hazards that arise when military planes get into the commercial lanes.

I do not see what that does.

Colonel WARFIELD. May I say——

Mr. MINSHALL. Was this operating IFR or VFR?

Colonel WARFIELD. This jet was operating VFR.

Mr. HARDY. Is there any way under that set of circumstances that he could stay out of a commercial lane?

Colonel WARFIELD. The commercial lanes are like roads. They are highways of the air. And they are used by the airlines in clear weather and in bad weather. They are used by the military in clear weather and in bad weather.

There is no requirement that a local jet flight fly on one of these airlanes. At the same time, it is impossible to climb out of the Baltimore area without crossing airlanes, because in a 100-mile radius—I have a picture here, and I will pass it up to you gentlemen—there are about 15 separate airways in a 50-mile radius. The jets, to get up to an operating altitude of 40,000 feet, do climb through airways.

And the only regulations they have, if they are not under CAA regulation, are to maintain a close visual watch and clear themselves from all other traffic.

Mr. HARDY. Could they not avoid that kind of a situation if they were flying instrument?

Colonel WARFIELD. Will you repeat what situation you are trying to avoid?

Mr. HARDY. Trying to avoid a collision is what I am talking about. I hate to leave right in the middle of this, Mr. Chairman.

Mr. KILGORE. I think what Mr. Hardy had reference to was whether it would be possible on a local flight, as I understood this was, for the plane to clear the congested area, in this instance the Baltimore area, IFR, and then go into whatever local flight procedures he planned going into after he had left the airways, and by radio changed to VFR flight.

Colonel WARFIELD. If you are asking for my opinion, that would be a possible solution.

Mr. KILGORE. How difficult would it be, and how much of a burden would it be on your operation?

Colonel WARFIELD. It would cut down on our instant air defense readiness, and it would be limited by the number of planes that the air-traffic-control people could handle. And that is beyond my jurisdiction.

I do not know whether they could handle 25 of them taking off in a period of 15 minutes.

Mr. KILGORE. When you say "25 of them taking off in a period of 15 minutes," I take it part of your training is irregular scramble procedure; is that it?

Colonel WARFIELD. Part of our training is to scramble out and climb up to the 40,000-foot altitude and be picked up by radar in the local vicinity.

Mr. KILGORE. Insofar as that procedure is concerned, is your procedure in this mass takeoff operation and climb into altitude, one that has been coordinated with CAA with recognition of what local traffic problems are?

Colonel WARFIELD. The CAA, to my knowledge, does not wish to take control of these flights unless a request is made for an IFR clearance.

Mr. KILGORE. I did not have reference, actually, to the matter of their exercising control, but whether or not there had been any coordination, particularly in just an examination of the problem to ascertain how you get these planes up and out the area, which would likely be occupied by commercial flights, with the least possible danger.

Colonel WARFIELD. Well, in my position in the guard, I have not set the policy. And we operate with current regulations, and in clear weather we can take off and fly in the local area without checking with CAA as long as we follow established rules of minimum ground clearance, minimum cloud clearance, minimum clearance from another airplane. And they are general CAA rules that apply to all takeoffs, as I understand.

Mr. KILGORE. All right. So far as you know, then, there has been no effort at local coordination with respect to what local problems may be? I am referring to a compliance with basic regulations with respect to either IFR or CFR flight.

Colonel WARFIELD. I cannot say that, because for over a year our unit operated out of Friendship under full control of the CAA

tower operators, and were given priority according to the CAA wishes.

And now we have another unit operating at Harbor Field, operating under another set of CAA operators, and they have full control over our military takeoffs in good weather and in bad.

The only difference is that at the Martin Co. our takeoffs are controlled by operators licensed by the CAA, but not CAA employees. They are paid, because it is a private strip, by the Martin Co.

Mr. KILGORE. Are most of your operations carried on under contact-flight rules?

Colonel WARFIELD. I would not like to enter in the record the figures until we get the exact percent, but I would say most of them are carried on under visual flight rules. And we will get the information submitted for the record.

(The following information was furnished:)

As of January 1, 1958, through May 22, 1958, 89 percent were conducted under visual-flight rules; 11 percent under instrument-flight rules. These are all jet tactical flights.

Mr. KILGORE. Of course, when you do operate under instrument-flight rules, then you operate under a clearance previously obtained before takeoff?

Colonel WARFIELD. We positively have to respect the CAA flight rules, and we do not even start the engine until we have written down and read back to the CAA operator the complete clearance and repeated it for correctness.

And they control this, and give us a block of air, which we stay in from takeoff to landing, and only deviate from with CAA permission, under instrument flight rules.

Mr. KILGORE. In an area as congested as is the Baltimore area—and it no more than many others—from your experience of operations there, have you had occasion to know of near misses before, and sufficiently close passes that you find this to be a problem that is not related specifically to this isolated incident?

Colonel WARFIELD. Mr. Kilgore, in all honesty, every pilot that has ever flown any number of hours has had what might be termed near misses, when he raised his eyes just in time to take corrective action. The pilots of our unit are probably no exceptions.

Mr. KILGORE. Have you any compilation of any such reports, or is any such record or notation made of the reports your pilots make to you with respect to this sort of thing?

Colonel WARFIELD. After each flight, our pilots are what we call critiqued. All problems are brought out and freely discussed to keep them from being repeated, and any near misses would absolutely be brought out.

Mr. KILGORE. Have you any information with you now you can give us with respect to what you found on near misses?

Colonel WARFIELD. I would like to wait a minute and check with my operations officer. I do not think we have compiled a running log on near misses, because we have not had that many.

I do know if a near miss is reported to the CAA, they do make a log of it.

Mr. PLAPINGER. Colonel, has the squadron ever reported any instance of near miss to the CAA?

Colonel WARFIELD. I cannot answer that question because I do not know.

Mr. PLAPINGER. There have been instances of near misses; but you do not know whether these have been reported to the CAA?

Colonel WARFIELD. Well, it depends on what you term a near miss. We have authority to bring our jets in at 1,500 feet over the Martin strip and make a gentle left turn and lower the gear and the flaps and make a landing pattern, and many times it has happened to me that a light plane, under no control, will go flying right across in front of a flight of jets. And it is up to the pilot to look out for them.

That is a near miss, but it is commonplace. And to prevent that you have to have control over all the light civilian aviation planes, and the farmers that are flying planes, and the jets and the airliners. I think I speak from experience because I have a light plane myself, and for my own preservation I take a great interest in looking around at all times.

Mr. KILGORE. Is your own plane radio-equipped?

Colonel WARFIELD. My own plane is radio-equipped. I do not know whether it makes it any safer, because the airways are normally saturated with radio chatter.

Mr. PLAPINGER. What kind of equipment do the jets have in this respect?

Colonel WARFIELD. The jet has the best radio equipment money can buy, a 20-channel UHF, which is clear and free of static.

Mr. PLAPINGER. Have there been any instances reported of near misses involving commercial airlines?

Colonel WARFIELD. To my knowledge, no, sir.

Mr. PLAPINGER. Are you familiar with the studies concerning the rapid rate of closure in jet flying?

Colonel WARFIELD. I have had a first-hand picture of it because I fly a 600-mile-an-hour jet, and very often I have passed one going 600 miles an hour the other way. So you get a very definite picture of it.

Mr. PLAPINGER. We are told that some of these studies conclude that by the time the jet spots a speck on the horizon which might be a plane, the rate of closure is so rapid that it precludes taking evasive action.

Do you have any comment to make on that, Colonel?

Colonel WARFIELD. I only have my personal opinion, that if you see a spot on the horizon, you can certainly avoid it.

Mr. PLAPINGER. You think there is sufficient time to take evasive action?

Colonel WARFIELD. I do. To get down to simple arithmetic, if you are going 10 miles a minute, that is 600 miles an hour.

Mr. PLAPINGER. Do your planes fly at that speed?

Colonel WARFIELD. Ours will generally cruise at 8 miles a minute.

Mr. PLAPINGER. That is approximately 500 miles an hour.

Colonel WARFIELD. Yes; 480, 500. And this T–33 trainer goes closer to 6 miles a minute.

What I am getting at is that a normal person with good eyesight can probably pick out an approaching plane 10 miles away, so you actually have a minute and a half, going at 6 miles a minute, to take

corrective action. I would say 20 seconds would be adequate. In 5 seconds you could do it.

Mr. KILGORE. Of course, if you assume a collision head on, you cut that time in half.

Colonel WARFIELD. It would cut that time in half; that is correct, sir.

Mr. KILGORE. And the visibility conditions would bear on it directly, too.

Colonel WARFIELD. The visibility is the biggest factor.

Mr. PLAPINGER. You have talked with Captain McCoy, I gather.

Colonel WARFIELD. I have talked with Captain McCoy, but I would like to state that his condition is not very good. He had a 104° temperature when I talked to him. And he is shocked and burned.

Mr. PLAPINGER. Will you tell the committee what you know about the accident from your conversations with Captain McCoy and from other sources. Will you identify the source of your information and the date upon which the information was obtained, Colonel.

Colonel WARFIELD. On May 21, 1958, at 1530, that is, 3:30 yesterday, eastern daylight saving time, the following questions were put to Capt. Julius McCoy, 104th Fighter Interceptor Squadron, Maryland Air National Guard, concerning the air collision which occurred May 20, 1958, near Frederick.

Questions were put by myself, and verified by Colonel Kilkowski, who is in the room.

The initial question was, "Who made arrangements for this indoctrination flight with this private in the back seat."

Answer. Capt. Julius R. McCoy.

Question. How long before the flight were final arrangements made?

Answer. He had known the boy for 3 years, and 4 days before flight final arrangements were made. He checked in with 104th Operations and Headquarters on the day of the flight.

Mr. KILGORE. Colonel, we are having trouble hearing you.

Colonel WARFIELD (continuing):

Question. What time was he supposed to get to the airport?

Answer. Nine a. m., eastern daylight time. He arrived at 9 a. m., eastern daylight time.

Mr. PLAPINGER. This is the Martin Airport?

Colonel WARFIELD. The Martin Airport, sir.

Question. How long did the briefing last?

Answer. Briefing lasted 1 hour: 30 minutes personal equipment; 30 minutes airplane, general procedures, and flight plan. This included the helmet, parachute, Mae West, oxygen, flying suit, ejection procedures—seat and canopy, interphone, briefing in general on flight routes and procedures, and the emergency procedures. He was briefed on personal equipment by the personal equipment section, supervised by Captain McCoy. Sergeants Nolan and Fiedler witnessed briefing by Captain McCoy on aircraft and procedures.

Question. What was the purpose of the flight?

Answer. Indoctrination and orientation—flight to develop interest in a possible cadet applicant.

Question. What was the maximum altitude of flight?

Answer. Under 10,000 feet. Mission was limited by standard operating procedures to 18,000 feet or less.

I would like to clarify that. There is a requirement that any passenger that rides in a military jet must stay below 18,000 feet unless

he has gone through this low-pressure chamber which tests his eardrums and reflexes.

To go back to the transcript:

Question. Was aircraft climbing, level, or descending at time of crash?
Answer. He left the Harpers Ferry area at 5,000 feet climbing and passed through 8,000 feet over Brunswick in a slight climb to return to Baltimore, intending to climb to a higher acceptable altitude to conserve fuel on return.

I would like to make another comment: that the higher the jets fly, the less fuel they use.

Question. What was airspeed prior to collision?
Answer. Exact airspeed was unknown at impact.
Question. Was he low on fuel at Harpers Ferry?
Answer. No. He had at least 200 gallons. He had just turned on leading edge fuel transfer pump at Harpers Ferry.
Question. Did he have speed brakes down?
Answer. No.

Mr. PLAPINGER. Excuse me, Colonel. How far is Harpers Ferry from the Martin Airport?

Colonel WARFIELD. I have a map and will check that back with you in a minute.

Mr. PLAPINGER. It is within the 100-mile radius?

Colonel WARFIELD. It is within roughly 80 miles, I would say; but we will check. [Reading:]

Question. What was the heading after turn at Harpers Ferry?
Answer. Navigation was by visual reference and heading was approximately 80°.
Question. Did the T–33 have external fuel?
Answer. No. Flight duration did not require it.
Question. Was passenger at any time in control of aircraft?
Answer. No.
Question. What was the route of the flight?
Answer. He took off at Martin Airport on runway 14 at 1107 eastern daylight time, made a turn down Middle River, and right turn down Chesapeake Bay. He headed south of Friendship and passed north of Washington to Leesburg, and made the turn around Leesburg. Then he proceeded to Harpers Ferry and made a turn around Harpers Ferry at approximately 5,000 feet. Departed Harpers Ferry climbing toward Frederick to return to Baltimore and crashed.

That was the end of the interview.

The distance from Harpers Ferry is 70 miles from Harpers Ferry to Martin's.

Mr. MINSHALL. Does that part at the end indicate he was in the process of making a turn at the time of the crash?

Colonel WARFIELD. I will reread this statement to clarify it:

Then he proceeded to Harpers Ferry and made a turn around Harpers Ferry at approximately 5,000 feet. Departed Harpers Ferry climbing toward Frederick to return to Baltimore and crashed.

Mr. MINSHALL. At the time of the impact, he was on a straight course?

Colonel WARFIELD. Straight course. And this is testimony that may be refuted tomorrow by the investigators, but this was taken from the injured pilot, talking under duress, with a 104° temperature. And as of today, the doctors have not let anybody else question him.

Mr. KILGORE. When you say "duress," you do not have reference to any sort of coercion?

Colonel WARFIELD. No, I would like to extract that from the statement with your permission. It was taken under rather difficult conditions. "Duress" was the wrong word.

Mr. KILGORE. All right.

Mr. MEADER. Mr. Chairman, may I ask a question?

Mr. KILGORE. Yes.

Mr. MEADER. Colonel Warfield, by your statement that the statement was taken under difficult conditions, do you mean to imply that Captain McCoy was not in complete possession of his faculties at the time you interrogated him?

Colonel WARFIELD. There is no question of the fact that he was in a definite state of shock.

Mr. MEADER. And how long did the interrogation last?

Colonel WARFIELD. Approximately 20 minutes.

Mr. MEADER. And is the brevity of the statement due to your feeling that he was not in condition to answer further questions?

Colonel WARFIELD. It is. The head of the hospital, after we terminated our questioning, would not let anybody else talk to him. And I have known him for over 5 years, and I could tell by his actions it was time to conclude the interview.

Mr. MEADER. Now, knowing him over a 5-year period, and noting his behavior yesterday afternoon during this interrogation, did you have any doubt about the accuracy of his recollection or whether or not he was of sound mind, enough to make an accurate statement?

Colonel WARFIELD. I have no opinion on that subject, Mr. Meader.

Mr. MEADER. Well, I mean one way or the other, you do not have any——

Colonel WARFIELD. I would rather not have taken his statement in the condition he was in, because I know that he was not completely rational because of the terrific ordeal he had been through. And if you could look at him, you would believe it.

Mr. MEADER. Now, was he required to report to anyone during the course of this flight?

Colonel WARFIELD. He was required to get clearance to take off. He was required to clear himself from clouds and maintain a certain altitude above the ground. His next required report would be to request instructions to land.

He was a free agent as to where he traveled on a local flight plan within the local area.

Mr. MEADER. So, as a matter of fact, in this particular instance, do you know whether or not he did make any reports after taking off?

Colonel WARFIELD. I will check that, sir.

Colonel KILKOWSKI. He did not make any to us.

Colonel WARFIELD. To our knowledge he made no radio contacts with Martin Co.

Now, it is possible—and we have no way of checking—he went to another frequency. He could have called some other airbase.

(The following information was furnished:)

No, he did not make any reports.

Colonel WARFIELD. Colonel Kilkowski has brought up one point. The official statement will be taken under better conditions by the Air

Force, and they will get his official certified statement. I went to him to get this, because I felt this committee would want a certain amount of information.

Mr. MEADER. Colonel Warfield, aside from interrogating Captain McCoy, what other inquiry have you made with respect to this accident?

Colonel WARFIELD. Mr. Meader, it has been of such national importance that without any action on our own part there was an automatic inquiry started by the CAB, and they are coordinating a joint effort team, comprised of CAB members and Air Force members from Bolling Field, and Air National Guard members, and Air Force officers from the Office of Flying Safety of Norton Air Force Base in California. It is a very large team that will stay with the accident until the facts have been determined.

Mr. MEADER. And you have no part in that particular investigation?

Colonel WARFIELD. We have no power. They have done us the courtesy of allowing one of our officers to act as an observer on the team.

Mr. MEADER. But you did make an inquiry to see whether or not Captain McCoy had reported in to the tower at Martin Field?

Colonel WARFIELD. I did not make an inquiry with Martin tower. I would like to check it and report back for your record.

But that will come out in the regular inquiry.

Mr. MEADER. In your regulations—and this may be a question that was covered while I was absent to answer the quorum call—what knowledge do you customarily, as a matter of course, give to your pilots as to operations of commercial airlines in the area where your pilots are operating?

Colonel WARFIELD. We brief them regularly, once a week, sometimes more often, on the danger of airline flights. The alley from Washington to New York to Boston—I think an airline pilot told me 200 flights go up and down that corridor every 24 hours. And that information has been put out to our pilots on a weekly basis.

And Colonel Kilkowski stated after the accident that he just remembered my tirade a week before about staying absolutely clear of airliners and clearing them at all turns.

Mr. MEADER. Is there any regulation that information concerning operations of commercial airlines on regular schedule be made available to pilots?

Colonel WARFIELD. There is no regulation on that, sir.

Mr. MEADER. As far as you know, neither the Air Force nor National Guard has any regulation requiring information concerning the operational schedule of commercial airlines to be made available to military pilots?

Colonel WARFIELD. We have no regulation on that, sir.

Mr. MEADER. Have there been any recent changes in procedures as a result of, say, the Nevada crash or other midair collisions, concerning the operation of military flights to promote further safety, to your knowledge?

Colonel WARFIELD. We have a continuing volume of safety advisories that come to us from the Air Force on every incident or accident. The commanders are required to tell their pilots about it in briefings.

So, without citing a specific instance, yes, our pilots were briefed after the airliner crashed in Colorado, where two of them ran together, and the one over Nevada. Our pilots were briefed at both times to be doubly on the alert for airliners.

Mr. PLAPINGER. Are you familiar with the delegation of authority over the airspace by the CAB to the CAA?

Colonel WARFIELD. The policymaking is a little bit over my head, so I cannot honestly say I know, sir.

Mr. PLAPINGER. Have you received any recent directives from the Air Force to check with the CAA before engaging in training operations?

Colonel WARFIELD. I would like to check it, with your permission.

(Discussion off the record.)

Colonel WARFIELD. No, sir.

Mr. PLAPINGER. To your knowledge, are your National Guard units permitted to deviate from civil air regulations just by notifying the CAA of the deviation?

Colonel WARFIELD. Absolutely not.

Mr. PLAPINGER. Apropos of Mr. Meader's question and specifically directed to the Maryland crash: Has there been any change in procedures that would require the operations officer to find out what commercial flights are in the vicinity before authorizing takeoffs of National Guard planes?

Colonel WARFIELD. We have been under such pressure that we have not set up any new procedures, except to try to continue the very safest operation we can possibly accomplish. And we do not accept any responsibility in this accident until it is determined exactly from the board which ship hit which.

Mr. PLAPINGER. Colonel, I am sure I do not have to remind you that it takes two to make an accident, and the more people that are careful, the better it is for air safety.

Colonel WARFIELD. I would like to rephrase it, that we do not accept full responsibility until the board determines the location of the ships.

Mr. PLAPINGER. I understand that, but the answer to my question is that there has been no change in procedures with respect to checking the presence of commercial airlines in the vicinity?

Colonel WARFIELD. No, sir. We have not gotten airline schedules and briefed pilots because there are so many airlines going in so many different directions at so many different altitudes on so many different clearances, it would be a good bit of information for a pilot to keep in his head at a given point in the day, to know which flights were arriving and which were departing.

Mr. PLAPINGER. Colonel, I know you are concerned, as is everybody, about the recurrence of these crashes. Do you have any thought or opinion on what can be done to avoid recurrence?

Colonel WARFIELD. Well, I would not be human if I did not have an opinion, and we have to accept orders and policies as promulgated by the CAA and the Air Force and the Guard, but my opinion is these accidents have to stop, and there has to be some way to stop them.

And I would hope that, if nothing else comes out of this, we can separate this traffic.

And you are going to say: How can we separate it?

I am going to say: Mostly by altitude separation, and possibly by giving the jets a corridor of clear air—and CAA would have to give it to us—which did not touch any airway, which did not cause us to go through 10 airways climbing to altitude and letting down from it.

These are my personal opinions.

Mr. PLAPINGER. Would this be feasible for the military, to carry on flights only in these areas?

Colonel WARFIELD. I think they should have a good deal of leeway after they got to altitudes, because the jets normally operate at 40,000 feet. Airline traffic is somewhat lower.

This would be an initial solution, or a partial solution.

Mr. MEADER. Colonel Warfield, what record is kept of a flight such as the one that Captain McCoy made? In other words, what record is kept of departure, arrival, and anything else that was particularly characteristic of his flight? What kind of written record is available?

Colonel WARFIELD. Sir, there are many records. One is kept by the tower. They log each takeoff and landing, and the ship number.

Mr. MEADER. And that is kept by the controller at the Martin tower?

Colonel WARFIELD. Yes. The next one is kept by the pilot. There is a logbook in each plane, and before he climbs into the plane he has to put his name, rank, serial number, and purpose of flight down on this log. And when he lands, he puts the amount of flying time that he accomplished, and every day that information is taken out of the jet and taken out of the log, and is entered on a permanent record so at the end of a given 10-year period you can look at a pilot's form 5, we call it, and determine his total flying time, each and every mission, date and type of airplane.

We have that on Captain McCoy.

Mr. MEADER. We have that on Captain McCoy?

Colonel WARFIELD. We know each flight he made to get 2,000 hours.

Mr. MEADER. Was the log in this flight preserved?

Colonel WARFIELD. I would like, if you will permit me, to make a guess that the records were burned in the crash if they were on the jet, but the investigating board will determine if anything was left of the records.

We know at the base what time he took off, and we entered it in a record at the Martin airstrip, but we do not have the flying log because it was along with the jet.

Mr. MEADER. And it was consumed?

Colonel WARFIELD. It was consumed, but it was just that one flight. I would imagine it was consumed.

Mr. MEADER. You do not know?

Colonel WARFIELD. I do not know.

Mr. MEADER. Now, as I understand it, before commencing his descent or his approach, at any rate, the pilot is required to clear with the Martin tower again, or whatever tower he may be approaching; is that correct?

Colonel WARFIELD. That is correct.

Mr. MEADER. And would a record of this instructions be kept by someone, the tower probably?

Colonel WARFIELD. Some of the towers have a tape recorder to record all calls. I do not know whether Martin tower has a transcript of the pilot's call for a landing. But they would enter, as the ship comes in, the pattern; as his wheels touch the ground, the ship number, and what time it landed.

Mr. MEADER. Would they also make some kind of a written record of instructions given during the approach, and permitting him to make the approach?

Colonel WARFIELD. I do not know in this specific case, and we will have to check and report it back to you, sir.

(The following information was furnished:)

No written record is kept. It is recorded on magnetic tape and retained for 24 hours.

Colonel WARFIELD. I know from personal experience this is the normal procedure:

They say, "Guard Jet 2888, you are cleared initial. Runway 32. Report turn onto initial."

"Turn onto initial" means coming in over the end of the strip at 1,500 feet.

Then they make a further clearance to be sure nobody else is around, no light plane is cutting across. Then they say, "Report break."

The break is the time when you turn left and lower your gear, and flaps and come in for a landing.

So you make two reports to the tower, and they acknowledge them, and if they do not acknowledge them, you go around and wait for instructions. But you do not just arbitrarily bull your way in and land.

Mr. MEADER. What I am interested in is whether or not any record is kept of such instructions or whether they are just oral instructions and there is not any written record of them or tape-recorded record.

Colonel WARFIELD. There is no regulation for a tape recorder. I do not know whether any record was kept on this flight. We will check and it will come out in the investigation and we will report back to you whether a record was made of any call.

Mr. PLAPINGER. Do you know if there is any requirement that a tape recorder be kept? Mr. Thomas, do you know?

Mr. THOMAS (David Thomas, Director, Air Traffic Control, CAA). No, sir, there is no requirement under the official flight rules.

Mr. PLAPINGER. In all CAA control towers there are such tape recorders, but you have no such requirement for CAA licensed personnel?

Mr. THOMAS. There is no requirement for a written record at the Air Force.

Mr. PLAPINGER. Colonel, you mentioned as a possible measure altitude separation. What is your opinion concerning speed separation as a safety measure?

Colonel WARFIELD. I would like you to restate the question a little bit further so I can understand exactly what you are driving at. Speed separation?

Mr. PLAPINGER. Speed or time separation as a safety measure.

Colonel WARFIELD. Will you give me an example, and then maybe I can answer you.

Mr. PLAPINGER. Well, I assume that if a light plane takes off, a jet would be kept way behind it because of the disparity in the speeds of the two planes.

Colonel WARFIELD. That is, in my opinion, a good solution, and they are presently using that. But it would only be pertinent when they were using the same airway and the same elevation and going the same direction.

Mr. PLAPINGER. Another way of saying the same thing, I suppose, is to require an IFR for all jet operations.

Colonel WARFIELD. That is a proposal that I have seen put forth, and I think the final determination will not come from me. It will come from the CAA.

If they can hadle that volume, that will be one solution. And my comment, from a low policymaking level is it will hinder the air defense readiness.

Mr. PLAPINGER. How will it hinder the air defense readiness?

Colonel WARFIELD. On bad days we have to wait for clearances before we take off the ground. When the weather is bad, it is not uncommon to wait 15 minutes, and many times I have had to wait 2 hours. And if you had to wait 2 hours for each of 25 jets, we would not be quite as operationally ready to take off at a moment's notice and get the altitude and go about the job.

That is the only way it would hinder us.

That is why I was proposing—and you asked me for my opinion—just a clear funnel which would be kept clear of airways.

Mr. PLAPINGER. Your answer, I gather, is predicated on the lack of possibly either equipment or personnel in the CAA to handle this situation on IFR.

Colonel WARFIELD. I would rather not speak for CAA on it. You asked me if it was feasible. I believe that was the original question.

The second question was: Would it limit operations? CAA would have to say whether it is feasible, sir. And yes, it would slightly limit our operations, or greatly limit our operations.

Mr. KILGORE. Colonel Warfield, in the interview you related to us with Captain McCoy, no specific questions were asked with relation to this crash itself, whether or not he saw the airplane.

Was your interview so limited you did not get into that, or what is the situation with respect to that question?

Colonel WARFIELD. I did not ask the questions specifically at that time, but he volunteered a comment as he was first brought into the hospital that all he knew was that he was going end over end. He never saw another airplane, or knew about another plane, until a sheriff at the hospital said there was another plane involved. That was the only statement that I heard him make.

Mr. KILGORE. Mr. Minshall, have you any questions?

Mr. MINSHALL. Just a remark off the record.

(Discussion off the record.)

Mr. MINSHALL. If I may ask a couple of questions, to refresh my own memory, what is proficiency requirement that you have in the Maryland Air National Guard? That is, flying time, hours per week?

Colonel WARFIELD. I am going to give that over to Major Maisch because he is the person who is on a full-time basis, as a major, operations officer.

Mr. PLAPINGER. Excuse me. Did you say you were full time?

Colonel WARFIELD. I am not full time. I run a newspaper and five farms.

Mr. PLAPINGER. I would think you were not full time.

Colonel WARFIELD. I keep busy; yes, sir.

Major MAISCH. We require of our pilots a bare minimum of 10 hours per month in the tactical airplane; plus 1 instrument ride in the back seat of the T–33, the type that crashed the other day; the 10 hours to include a breakdown of an hour-forty of instrument time and 1 hour and 15 minutes of night time per month.

This we have considered to be a bare minimum.

Mr. MINSHALL. Suppose we grounded all the Air Force training for a period of several weeks until this thing was finally resolved, would that interfere with your defense readiness to any marked degree?

Major MAISCH. It would definitely affect it depending on the individual pilot's proficiency. A weak pilot would be affected more.

Mr. MINSHALL. You say it would definitely affect the combat readiness of a unit?

Major MAISCH. Yes, sir.

Mr. MINSHALL. Supposing a pilot goes on a vacation for 2 weeks? In other words, your combat effectiveness goes way down while he is off on vacation?

Major MAISCH. Yes, sir. There is a definite proficiency curve in, I would say, all pilots; when they fly twice a day, they are probably up to the peak of their proficiency. If they fly once a week, they are down considerably lower. Then if they fly once a month, they are not safe in the air. If you increase the number of times or decrease the number of times they fly per month, they become that much less safe.

Mr. MINSHALL. Then just for practical purposes, suppose the CAA or the President, or someone, should say "No more training flights for a period of 2 weeks except in time of emergency. When the bell rings, then you go." For 2 weeks, no more flying until we resolve this situation; that is the conflict that exists between the civil aviation and our Air Force and Army aviation. How much would that impair the effectiveness of your unit?

Major MAISCH. Well, I think on the average, most units would have to go back partially to a transition period instead of——

Mr. MINSHALL. You would not have to go back to primary training, would you?

Major MAISCH. No, sir. What I mean by "transition" is to be sure they know how to fly an airplane again.

We take for granted after a man has——

Mr. MINSHALL. You mean 2 weeks off from a jet ship and the man forgets how to fly?

Major MAISCH. Not to a high degree, but a person who has—and we have one in our unit, a pilot who has just a bare amount of time, he has graduated from flying school within the last 3 or 4 months, it

would affect him considerably. When a pilot with longer experience is temporarily grounded, it would not be missed too much.

Mr. MINSHALL. Well, then, for all practical purposes it would not interfere too much, would it, to ground everything for a couple of weeks until this thing was resolved? Just so we do not have any more air crashes for that period at least because this VORTAC and other equipment they have to install is going to take a great length of time and we have to have some kind of emergency measures it seems to me until this thing is resolved between the civil and the military.

Major MAISCH. For a 2-week period, no, sir, I do not believe it would be that much of a problem.

Mr. MINSHALL. Are you familiar with the minimum flying requirements that the regular Army Air Force has over at the Pentagon?

Major MAISCH. Well, yes, sir, they are exactly the same as ours.

Mr. MINSHALL. Ten hours per month?

Major MAISCH. Well, our 10 hours per month is greater than the Air Force minimum, but 100 hours per year.

Mr. MINSHALL. Well, the Pentagon people informed me that they only require 4 hours a month.

Major MAISCH. That is for pay purposes in the Regular Establishment.

Mr. MINSHALL. Well, then, they can fly 4 hours a month for pay purposes; is that not enough to maintain their flying proficiency?

Colonel WARFIELD. You are putting us on the spot.

Mr. MINSHALL. I do not mean to put you on the spot; I am just trying to get information.

Colonel WARFIELD. In our opinion 4 hours a month as a Maryland Air National Guard pilot is very dangerous and there will be a lot more accidents.

We consider 10 hours absolutely minimum to keep a man safe. If he gets less than 10 hours, he is dangerous flying.

We like to fly 20. We feel the more a pilot flies, the safer he is. I would like to see the pilots get 200 hours a year if possible. Some get 300 or 400.

Mr. MINSHALL. I am aware the more flying you get, the more proficient you are. But I am just asking you now if we grounded all these things, these training flights at least for a period of 2 weeks, or short periods of time until the situation is settled, would that interfere with your operation?

Colonel WARFIELD. Yes, sir, it would. There would be a period of phasing people back into jets and it would make them dangerous.

These are not training flights; they are really proficiency flights.

You have been trained by the Air Force. You come back from the jet training. You continue to maintain the training you have. You continue to keep your proficiency.

Now, I am going to be specific, the proficiency consists of so many hours flying at night, so many hours flying instrument, so many hours firing at a target over the Atlantic Ocean, so many hours of navigation, so many hours camera gunner shooting at a target.

If we just say, "Well, we will make everything safe by taking all the airplanes out of the sky," I do not think it would accomplish the purpose of keeping our air defense ready.

Mr. MINSHALL. I do not say take all the airplanes out of the sky; I say some of these training flights, such as this one that just caused this crash with the Capital Airlines.

Was that a necessary flight?

Colonel WARFIELD. Yes, sir, it was necessary to maintain the proficiency of the pilot who has to fly these planes every day, because he is a maintenance officer and he tests them. To be competent to test them, he has got to fly them.

Mr. MINSHALL. How many hours did McCoy have in this particular month?

Colonel WARFIELD. With your permission, I will check, sir.

Twenty-one hours and thirty minutes.

Mr. MINSHALL. He was way over, then. In other words, this was pretty much of a—I don't like to use the expression, but pretty much of a "joy riding" flight for him; was it not?

Colonel WARFIELD. No, sir, we do not accept the term "joy riding."

His job requires him, more so than the other pilots, to fly a good deal of time because if you only fly each jet once a month, you get 25 hours. He has 25 jets. He is paid full time, has a crew of full-time technicians. He checks all the instruments, fills in checklists.

Mr. MINSHALL. Is that what he was doing on this day, checking the instruments?

Colonel WARFIELD. No, sir. This was not a specific test flight; it was a proficiency flight to maintain his proficiency in a T–33, which is a different plane and he does not fly it as often as the F–86–H's, which are unit equipment.

Mr. MINSHALL. Since this crash in Nevada—I know someone started to ask a question and I had to leave for the quorum call—have you received any specific instructions in the Air Force as to maintaining an extra alert or flying at specific altitudes? Especially in congested areas and over airways?

Colonel WARFIELD. There are three questions there.

Let's see, first of all, since the crash involved——

Mr. MINSHALL. Would you answer the three questions.

Colonel WARFIELD. Yes, sir; I will try to take them one at a time.

Since the Nevada crash, we have briefed our pilots on maintaining a continuous visual watch at all times and we have briefed them continuously, and we brief them before every flight.

Now, as far as the Air Force sending down an order to brief them, I will have to check.

Do you know, Major Maisch?

No, no specific order has been received from the Air Force.

Now, as far as crossing airways, I would like, with your permission, to read you this excerpt from the regulation.

Do you have that here? Where is it?

I would like to pass that question and give you an answer on it later when we check it.

Mr. MINSHALL. You have received no specific instructions from higher headquarters other than to increase your briefing; is that correct?

Colonel WARFIELD. We have increased our briefing just for self-preservation. We are just as scared of hitting airliners as they are of hitting us.

Mr. MINSHALL. You have been repeating the same old rules that have been causing these accidents?

Colonel WARFIELD. That is correct. We have no authority to change the rules, sir, so we have to abide by them, sir, until we receive different rules. And my immediate superior officer that receives these rules from the Air Force, Colonel Blanchard, who is at my right, may know some new Air Force rules requiring different procedures on airways that are coming down. But to my knowledge, we have not gotten them.

Do you have a comment to make, Colonel Blanchard?

Colonel BLANCHARD. I am in the Guard Bureau, which is more or less the go-between between the Air Force and State National Guard.

Mr. MINSHALL. I am sorry, I cannot hear you.

Colonel BLANCHARD. We have not received in the Guard Bureau any specific instructions relative to the accident that took place in Las Vegas as far as traffic is concerned. We have had advisories for more caution while under both visual conditions and instrument.

Mr. MINSHALL. You have had no instructions, then, to stay away from civil airlanes?

Colonel BLANCHARD. No; those airlanes are civil and military both. They are used by both.

Mr. MINSHALL. I know that is what has been causing the crashes because one is under control of the military and the other under control of the civil.

Colonel BLANCHARD. All under the control of CAA.

Mr. MEADER. Well, Colonel Blanchard, you recall the question I asked of Colonel Warfield about anything since April 1958, when the Civil Aeronautics Board delegated to the Civil Aeronautics Administration this airspace control? Are you familiar with that?

Colonel BLANCHARD. This will probably come to the Air Force. It has not come to the Guard Bureau yet.

Mr. MEADER. That is what I wanted to know; since that action was taken by CAB—I believe it was April 1 or about that time—have you received from the Air Force any new instructions concerning flights based on that order, or have you received any new instructions at all?

Colonel BLANCHARD. I will have to check that thoroughly and let you know. But to the best of my knowledge, we have not in the Guard Bureau.

Mr. KILGORE. Colonel Warfield, Major Considine, Colonel Kilkowski, Major Maisch, Colonel Blanchard, and Mr. Dietrich, we appreciate your coming; we appreciate your coming and appreciate the information you have given.

Colonel WARFIELD. Mr. Kilgore, we were glad to come over and answer the questions that we could.

I would like to leave one final comment on the record.

Mr. KILGORE. We would be pleased to have it.

Colonel WARFIELD. We feel the Air National Guard jet had just as much right to be in the air as any other planes that day and we will not accept the jet as causing the accident until the board comes forth with its findings.

Mr. KILGORE. We appreciate that, Colonel, and we would like you further to know the purpose of our inquiry is neither specifically related to blame for this particular accident nor is it related to blame

in any given accident. The purpose of our inquiry is broad. It necessarily has to be related to particulars in order to determine what the broader aspects of it are.

We are interested in prevention of accidents in the future, as you are. We are interested in the broad aspects of it. We do not care to reflect in any respect on the competency of anybody performing a mission.

Colonel WARFIELD. Our biggest stake is that we are in those jets so we are not too interested in having accidents.

Mr. KILGORE. Having had some military flying experience myself, I recognize the situation you find yourself in.

We are interested in development of information which we hope will aid in leading toward some sort of a change in procedures which will make your mission safer in peacetime as well as the mission of anybody flying an aircraft in the continental United States.

Let me say this one thing further to you, in the event any other information comes to your attention which you think will be of interest to us and which might add to the scope of this inquiry, we would appreciate it if you would feel free to send it to us.

Colonel WARFIELD. I will, sir.

Mr. KILGORE. Thank you very much.

Is Mr. James B. Franklin, vice president of Capital Airlines, here in the room?

We are very pleased to have you here, sir.

You have people with you. We will be pleased to have their names in the record.

STATEMENT OF JAMES B. FRANKLIN, VICE PRESIDENT, OPERATIONS AND MAINTENANCE, CAPITAL AIRLINES; ACCOMPANIED BY ROBERT B. HANKINS, GENERAL COUNSEL; AND CAPT. J. D. SMITH

Mr. FRANKLIN. Thank you.

My name is James B. Franklin. I am vice president of operations and maintenance, Capital Airlines.

I have Robert B. Hankins, general counsel, on my right; and Capt. J. D. Smith, one of our regular line captains, on my left, who not only flies the line regularly but has done quite a lot of work in safety and air-traffic control, and so forth.

We are here at your request to answer any of the questions that you care to ask. We do not have any direct statement to make concerning the situation at the beginning.

Mr. KILGORE. Have you any comment you would care to make on the testimony you heard from Colonel Warfield or those who accompanied him?

Mr. FRANKLIN. I believe not.

Mr. KILGORE. Mr. Plapinger.

Mr. PLAPINGER. Mr. Franklin, the plane that was involved in the accident belonged to your airline. Was that on a daily run, a so-called scheduled flight?

Mr. FRANKLIN. Yes; it is a daily run and it was right on schedule.

Mr. PLAPINGER. And is my understanding correct that it was flying under instrument flight rules?

Mr. FRANKLIN. Yes, under instrument flight rule clearance and had been given a clearance to descend from 11,000 feet into——

Mr. PLAPINGER. And is my understanding correct that this is a flight involving the so-called Golden Triangle?

Mr. FRANKLIN. Yes, sir.

Mr. PLAPINGER. Will you explain that to the committee, please, sir?

Mr. FRANKLIN. Well, the Golden Triangle is an area, its boundaries being Washington, Chicago, New York, back to Washington, forming a triangle. That area is an area that the scheduled airlines, the ATA, agreed with the CAA last July 1 to conduct all flights above 9,500 feet under instrument flight rule conditions in order to improve their training and ability to handle the flights better under instrument conditions when they did exist. Whether the instrument conditions exist or not, we did agree to conduct those flights from that time on under instrument flight rule conditions and clearances.

Mr. PLAPINGER. How long has this procedure been in effect?

Mr. FRANKLIN. Since July 1, last year.

Mr. PLAPINGER. And so that regardless of whether VFR could apply, IFR is required on all commercial flights wtihin this area, above this 9,500 feet, did you say?

Mr. FRANKLIN. Yes.

Mr. PLAPINGER. To your knowledge has there been any report of near misses made within this area in which a Capital Airlines plane was involved?

Mr. FRANKLIN. Oh, yes; yes, several.

Mr. PLAPINGER. What was the disposition of the report of the near miss? Was this reported to CAA?

Mr. FRANKLIN. Yes. We have a form that all the pilots carry with them that is mailed. I have a copy of the form here. But the form is filled out by the pilot and is mailed to the CAB. The CAB——

Mr. PLAPINGER. CAB?

Mr. FRANKLIN. Yes. The CAB has been tabulating these near misses for quite some time. I am not quite sure how long they have been tabulating them, but these reports are sent directly by the pilot who generally reports them to the company, and in some cases they are just mailed straight in and a report is made. But it depends on the circumstances because some of them are near misses that are much closer than others that are still called near misses.

Mr. PLAPINGER. Do you have a copy of the record of the report that is filed with the CAB?

Mr. FRANKLIN. I have a copy of the form.

Mr. PLAPINGER. No. When the report itself was made to the CAB, Capital Airlines——

Mr. FRANKLIN. They do not make a duplicate copy of that and send to the company involved. But we have a report that we keep ourselves on near misses.

Mr. PLAPINGER. I see.

Mr. FRANKLIN. It is filed in our flight operations department.

Mr. PLAPINGER. Do you have any idea how many of these reports have been made to the CAB since the Golden Triangle rules have been in effect?

Mr. FRANKLIN. You mean by all the airlines or just Capital?

Mr. PLAPINGER. By Capital. Approximately.

Mr. FRANKLIN. I do not know.

Mr. PLAPINGER. Would you supply that for the record?

Mr. FRANKLIN. I can supply that for the record.

Mr. PLAPINGER. Do you have any knowledge of the reports filed by all other airlines?

Mr. FRANKLIN. Well, the CAB came out the other day in the press, I believe, and said there was something close to 976 that had been reported in the last year. But that, of course—that was not just confined to the Golden Triangle.

I think it would probably take a little bit of time to sort out from all the files those that were confined to the Golden Triangle area.

Mr. PLAPINGER. To your knowledge, have there been any reports of near misses involving planes in the area of the Tuesday crash or involving planes of the Maryland Air National Guard?

Mr. FRANKLIN. During the last year, since the Golden Triangle has been put into operation you mean?

I do not know how you would call the area—I believe the closest would be up in the middle part of Pennsylvania, that I have knowledge of one near miss up there. But not in the immediate vicinity of——

Mr. PLAPINGER. Would you have any information as to whether the plane involved was assigned to the Maryland Air National Guard?

Mr. FRANKLIN. It was not, I am sure.

Mr. PLAPINGER. As far as you know, no plane of the Maryland Air National Guard has been involved in near misses?

Mr. FRANKLIN. To my knowledge, no.

Mr. PLAPINGER. Will you describe what your information is concerning this crash on Tuesday?

Mr. FRANKLIN. Well, as has been stated, the investigation is proceeding.

I was at the scene and was there very shortly after it happened. I flew up to Leesburg and drove on up. I could give a very brief description.

I think probably you would not want me to go into everything that I know about it today, as far as location of this and that, and plotting it out on the map. It would take probably much longer than you would want me to take.

I can briefly describe it and if that does not suffice——

Mr. PLAPINGER. Please proceed.

Mr. FRANKLIN. Well, to the best of our knowledge, from witnesses and from an examination of the wreckage of both aircraft, they were flying in a southeasterly or easterly direction. The exact direction is not known for either aircraft at the present time.

The jet trainer contacted our aircraft from the left-hand side up near the cockpit area and severed that in two with the fuselage and apparently the right wing of the jet trainer in what was described—and it will be confirmed or more accurately pinpointed after they have reconstructed the wreckage, which they are presently in the process of doing—as a right hand turn into the flight path of the airliner at approximately 8,000 feet altitude.

After the impact, our aircraft came down and made several turns. They think it made four complete turns in what could be described as a flat spin, but probably was more just coming down almost inbalance. It did not nose over and come straight down; it floated down making these four turns, and hit the ground in almost a belly landing or a flat landing condition. What was intact, of course, fits that description.

The other part that was severed came free and floated down—rather came down in a separate field across the road. The Air Force trainer fuselage went about roughly three-quarters of a mile or half a mile beyond where our aircraft landed and the engine of the jet trainer went approximately another mile beyond that in a southeasterly direction.

All four engines and the tail and a great portion of the fuselage of the airliner is in one area and refuse strewn over a very wide area that probably would cover a mile one way and perhaps a quarter of a mile the other way.

There are bits of wreckage of both aircraft together in the same area.

About the exact speed, altitude and direction, so far it is not known. It is generally felt——

Mr. PLAPINGER. You say the "exact" altitude?

Mr. FRANKLIN. Exact altitude and direction are not known at this time.

Mr. PLAPINGER. I see. You mentioned 8,000 feet before.

Mr. FRANKLIN. Yes; that is the altitude; we have been operating under the impression it was at 8,000 feet and that came from some source up there. But I am not sure that that will be accurate information because at first we were told that the trainer had been cleared to go to 8,000 feet, fly at 8,000 feet. But this afternoon's testimony was that he was at 5,000 feet at Harpers Ferry and so I would say that up until I heard that, I was fairly certain that it was around 8,000 feet or 8,300 feet.

Mr. PLAPINGER. If the planes were at 8,000 feet, would it be still under the "golden triangle" rules?

You mentioned the "golden triangle" involves above 9,500 feet. What happens if it were at 8,500? It would have to get a clearance to go to 8,000?

Mr. FRANKLIN. No; he was cleared under instrument flight rule regulations all the way in to Baltimore at Friendship Airport.

Mr. PLAPINGER. I see. Is there any communication maintained between the plane and your operations people?

Mr. FRANKLIN. Yes. The last company contact we had on the airplane of course is under airway traffic control frequencies between Pittsburgh and Washington. We had his outtimes, in and out of Pittsburgh, and his flight plan given and his estimated time given to us on his takeoff at Pittsburgh. Then he reports the balance of his checks directly to Air Traffic Control Center here in Washington.

We can always get in touch with him. We have constant communications with the aircraft if that was the question.

Mr. MEADER. Mr. Franklin, this flight number was what?

Mr. FRANKLIN. 200

Mr. MEADER. And you say that you received from the Pittsburgh traffic control—or Pittsburgh CAA personnel—the time of departure from Pittsburgh and his flight plan from that point to Baltimore?

Mr. FRANKLIN. No, sir. The last contact we had through our company radio was with our pilot direct, Capital Airlines radio network, when he gave his in-Pittsburgh times, his out-Pittsburgh times, and his flight plan and estimated plans to Washington. I have an exact copy of the radio contact we had.

Mr. MEADER. You do keep a record of that, do you, in the normal course of procedure?

Mr. FRANKLIN. Yes.

Mr. MEADER. And that is what you have in your hands?

Mr. FRANKLIN. Yes, sir.

Mr. MEADER. And that was the message received from the pilot of the flight?

Mr. FRANKLIN. Yes, sir.

Mr. MEADER. Flight 300 to your dispatch people, is it?

Mr. FRANKLIN. Yes, sir.

Mr. MEADER. Where are they located?

Mr. FRANKLIN. Well, our central dispatch office is in Washington.

Mr. MEADER. So the pilot gave this message to your people in Washington, is that correct?

Mr. FRANKLIN. He gave it to the Pittsburgh radio station we have there, and that was in turn relayed to Washington.

Mr. MEADER. And Washington is where the record is kept?

Mr. FRANKLIN. Yes.

Mr. MEADER. That is the only place the record——

Mr. FRANKLIN. Washington keeps a record; so does Pittsburgh keep a record.

Mr. MEADER. Now, when was the last time that you knew of the operation of flight 300 through that method?

Mr. FRANKLIN. Well, through our own company radio, the last contact we had was on takeoff at Pittsburgh.

Mr. MEADER. Will you read that record?

Mr. FRANKLIN. We have this record here. It is in code, so I will try to decipher it. It can be corrected if I make a mistake.

Flight 300, Pittsburgh, left, gate 5—on at 5, in at seven; out at 50 and off at 53. No service. Clear to Baltimore, 11,000 instrument flight, (IFR) instrument flight rules; in range of Baltimore with 6,100 pounds of fuel; estimated schedule, estimated Martinsburg at 09—that would be 1109.

Now, the balance of the radio records would have been kept by the Air Traffic Control Center, both in Pittsburgh and in Washington. Those records are maintained.

Mr. MEADER. This is the last communication?

Mr. FRANKLIN. Yes, sir; this is the last.

Mr. MEADER. Now, it is the practice of Capital Airlines when there has been an accident of this kind to make its own investigation independent of any official investigation made by Government agencies?

Mr. FRANKLIN. No. sir. We jointly make the investigation.

Mr. MEADER. And do you——

Mr. FRANKLIN. We supply all of the information that is possible for us to supply; and anything else that comes to our attention, of course, we get into it as much as we can and if we find anything that would apply, whether we are asked for it or not, we supply that. But we do not make a separate analysis and investigation of our own.

Mr. MEADER. And whatever you do with respect to investigation in Capital Airlines is under your direction, is it?

Mr. FRANKLIN. Yes, sir.

Mr. MEADER. And what record do you have of the results of such an investigation?

Mr. FRANKLIN. Well this investigation, of course, has just now really gotten started good. The man that I have assigned to this phase of it is R. W. Hardesty. He is at the scene presently and all the records are there; that is, all the records that have been gotten together are there. CAB have set up a temporary——

Mr. MEADER. What I am trying to get at, does he make current reports? Or do you get copies of proceedings of the investigation so that you at Capital Airlines have an independent record and are not required to rely upon whatever record is made by the Civil Aeronautics Board's safety investigation?

Mr. FRANKLIN. We do keep current and we do keep advised of the investigation that goes along, not only by our own people but by every team; we have an operations team, we have a structures team and a maintenance team. We have representation on each one of those teams. We are kept advised verbally as they progress as to what they have found, if anything. That record, of course, will all be completed after the investigation is completed and we would not be entirely bound to rely on anyone's findings, although we have complete confidence in these investigations and feel that they do get a very thorough analysis and the analysis is correct.

Mr. MEADER. There has been some suggestion that all traffic should be either controlled or else grounded.

What do you have to say about that, Mr. Franklin?

Mr. FRANKLIN. Well, I have several things to say about it.

First, we have an Airlines Operation Conference going on presently in Kansas City. I received this information by telephone this morning. We had a representative out there. I would like to read what the Airlines Operation Conference has adopted and will recommend. After that I would like to read a press release that Capital Airlines released this afternoon.

This is dated May 20, 1958:

KANSAS CITY, MO.

The Airline Operations Conference, comprised of representatives of all the United States domestic and international carriers, today called for the immediate creation of a single independent Federal aviation agency to exercise control over the Nation's air traffic. Announcement of the action was made by Frank Judd, vice president, operations, Northwest Orient Air Lines, and current president of the conference. Judd disclosed that the conference members, by formal resolution, declared that the Federal aviation agency "must provide for a single system of operation and also require coordination and interchange of flight information by all users of air space." This would include military, commercial, and general aviation.

In effect, the conference action reaffirmed a position which the airlines have held since 1954: that proper control of all aircraft operating in the same airspace is the only ultimate solution to the collision problem.

By voluntary action in 1955, the Airline Operations Conference adopted a planned program for transition to full positive control as rapidly as the capability and capacity of the Government-operated air traffic control system would permit.

This voluntary action was coordinated with recommendations of the Airline Pilots Association and has been in operation for the past year above 18,000 feet anywhere in the United States, and above 9,500 in the so-called Golden Triangle—between Washington, New York, and Chicago.

On July 1 of this year under the transition program, this 18,000-foot control level is to be lowered to 15,000 feet and on July 1, 1959, to 10,000 feet. However, in view of the success of the 18,000-foot policy and the Golden Triangle, the conference in its current session will consider advancing the program a full year—going directly to the 10,000-foot level and bypassing the 15,000-foot step.

This voluntary program is in addition to the long-established policy adopted by the Air Transport Association of establishing rules for air traffic control in high-density areas, such as New York, Washington, Chicago, and Los Angeles.

However, this voluntary action by the airlines, members of the conference asserted, must be supplemented by similar control, either voluntary or under compulsion of all other users of the airspace. Hence, the action called for a single system of separation.

A resolution adopted by the conference reaffirmed the conviction that the present air traffic control system "encourages the mixing of air traffic operating under different systems of operation"; namely, instrument flight rules and visual—see and be seen—flight rules.

The conference endorsed the extensive and intensive program of air traffic control expansion and modernization now under way by the Civil Aeronautics Administration and the Airways Modernization Board and said it would progressively improve the safety flexibility and capacity of the system. Full success, however, is dependent on the elimination of the dual system of air traffic separation and control.

That is the end of the message from the Airline Operations Conference in Kansas City.

If you wish, at this time I can read what we have released on the subject this afternoon.

I have additional copies here; I have about 20 copies with me.

This was released to the press at 3 o'clock this afternoon:

STATEMENT BY DAVID H. BAKER, PRESIDENT, CAPITAL AIRLINES, DATED MAY 22, 1958

Immediately after the recent military jet collision with a Capital Airlines passenger flight near Brunswick, Md., I released a statement in which I urged immediate action to correct the basic conditions which caused the fatal accident. I also expressed confidence that our governmental agencies would take appropriate action. However, since then, we have had at least one additional near collision with a military jet aircraft and nothing specific insofar as we know has been adopted. In view of the serious situation facing commercial airlines and the safety of our traveling public, Capital Airlines, the victim of the most recent military incident, proposes the following positive program:

Objective I: An immediate directive for implementation today to the military services by proper authority to—

(*a*) Ban all military miscellaneous maneuvering and acrobatics on, or immediately adjacent to, any official CAA airway.

(*b*) Require all jet aircraft climbs and descents below 25,000 feet made under visual flight rules (VFR) to be off existing airways.

(*c*) Direct positive disciplinary action to include court-martial of all military pilots who violate these regulations as well as other existing regulations which have a bearing on the safety of comercial air operations on the airways.

The above actions would positively and drastically reduce the chances of further incidents such as the two recent jet collisions and would not, in my opinion, interfere with our national defense in any way. If these directives had been in effect the past month, neither the United nor Capital collisions would have happened.

Objective II: That an intermediate program be implemented within 30 days after discussions with civil and military agencies. This program should include a refinement and definitization of the above points and full consideration of a requirement to provide that all military flights on commercial airways be directed to operate under the same controls and procedures currently followed by commercial airlines.

Objective III: A carefully considered legislative and administrative program to provide a single control agency to permanently insure adequate controls over military and civilian operations in airspace.

Means can and must be devised by responsible governmental agencies to accomplish these basic objectives.

Mr. MEADER. Mr. Franklin, this proposal or the statement of the operators council, is it, you read previously——

Mr. FRANKLIN. Yes, the Airline Operations Conference.

Mr. MEADER. Would that affect other air operations than military and commercial airline operations in any fashion whatsoever?

Mr. FRANKLIN. I am not sure if I understood the question.

Mr. MEADER. Now, as I understood this—I am not sure I got that first one you read.

Mr. FRANKLIN. You do not have that, no.

Mr. MEADER. In this statement you just now read, I do not see anything in there that would affect in any way any flight operations except those of the military and those of the commercial airlines.

What I refer to is other civilian flying would not be affected by the proposal in your release. Would it be affected by the resolution you read earlier from the operators' council?

Mr. FRANKLIN. I think that both have the objective of ultimately controlling all aircraft because——

Mr. MEADER. You mean business aircraft and general aviation would be controlled as well as military and comercial aircraft?

Mr. FRANKLIN. Yes, sir. Objective III on the sheet that you have:

A carefully considered legislative and administrative program to provide a single control agency to permanently insure adequate controls over military and civilian operations in airspace—

that is, all civilian operations, not just scheduled airlines, not referring just to scheduled airlines at all.

The immediate objective would be objective No. I, and it was along the lines that were talked about a little while ago, that was to immediately ban all miscellaneous maneuvering and acrobatics on or immediately adjacent to any official CAA airway.

Mr. MEADER. In other words, objectives I and II in your release would apply only to commercial airlines and to military operations; is that correct? But objective III would include all flights?

Mr. FRANKLIN. Objective III would include everything; yes, sir.

Mr. PLAPINGER. Mr. Franklin, one further question concerning these reports of near misses.

Have you ever been notified by the CAA or the CAB with respect to the disposition of any of your reports? Or have you ever seen the results of corrective action taken as a result of your reports of near misses?

Mr. FRANKLIN. Yes, we have taken the near misses up with the CAA or the control center involved, and each time they have investigated and have assured us that a similar instance would not happen.

I believe that they are doing a good job with everything they have, just trying to do just that.

Mr. PLAPINGER. You say in this statement by Mr. Baker that you had at least one additional near miss.

Mr. FRANKLIN. Yes, sir.

Mr. PLAPINGER. Have there been more?

Mr. FRANKLIN. Well, I know that there has been at least one, and we have had—I believe we have had two reported since the incident.

Mr. PLAPINGER. Since Tuesday?

Mr. FRANKLIN. I am just talking about our own. Yes.

There is quite a lot in the papers today about one of them, the one involving Captain Bradford, and I believe he was asked to——

Mr. PLAPINGER. I am sorry, I could not hear.

Mr. FRANKLIN. Captain Bradford, involving Captain Bradford in his Flight 301. Of course, I believe the Senate has a hearing this afternoon and he is testifying there pertaining to——

Mr. PLAPINGER. Is this the Findley incident?

Mr. FRANKLIN. Yes.

Mr. PLAPINGER. The Air Force bomber involved?

Mr. FRANKLIN. Yes.

Mr. PLAPINGER. And you said there was another one.

Mr. FRANKLIN. I was looking for the papers.

But about the same time that the incident happened at Brunswick, we had one in Chicago involving a military C–47 at around 4,500 feet with a near miss.

Mr. PLAPINGER. This is a DC–3?

Mr. FRANKLIN. DC–3, yes, military DC–3; C–47. It was around 4,500 feet in the vicinity of Chicago. I do not have the details on that.

Mr. PLAPINGER. Do you have the details on the Findley incident?

Mr. FRANKLIN. I have some details on it, yes.

This was taken from our control center, Mr. Coons log:

Trip 301, 22d, Captain Bradford, 15 passengers and crew of 4, just 1 minute west of Findley at 2003 eastern standard time. He had a B–47 make a decending left turn about 500 feet ahead of him and right across his nose, was cruising at 19,000 feet. He contacted the center and they said there were numerous military aircraft in the area operating "1,000 feet on top." Weather was CAVU at the time so this could have meant any altitude. Bradford told the controller to file a report on the incident and he plans to file one this a. m. with Capt. Doc Reid.

This note says:

Have Doc call Bradford if he wants Brad to come over to Washington to make up the report.

Bradford lives in Baltimore.

Mr. PLAPINGER. This was also on a Baltimore flight?

Mr. FRANKLIN. Yes.

Mr. PLAPINGER. And also within the "golden triangle"?

Mr. FRANKLIN. Yes, sir.

Mr. PLAPINGER. And were these under so-called VFR conditions even though you were flying——

Mr. FRANKLIN. It was VFR conditions and ceiling and visibility was unlimited, and we were on the IFR flight plan.

Mr. KILGORE. Mr. Minshall.

Mr. MINSHALL. I notice that many of your recommendations here, in the news release, 3 o'clock today, are directed specifically to the military.

It does not say what you commercial airliners should do to help alleviate these midair collisions. Do you have any comment on that?

Mr. FRANKLIN. Well, the Airline Operations Conference proposal that I read just prior to our news release, I thought, did cover it very well.

If not, I have an extra copy of it. I can——

Mr. MINSHALL. Most of your recommendations throw the "see and be seen" theory out the window, do they not?

Mr. FRANKLIN. Yes, sir.

Mr. MINSHALL. Is it not a fact some of these midair collisions have been caused by pilots who were not watching where they were going and not because of a fast closure rate between on-coming aircraft, such as happened over Grand Canyon, over Michigan City, Ind., and out in California?

What are you going to do about those kinds of midair collisions?

Mr. FRANKLIN. Well, under controlled flights at specified altitude and specified direction, without the maneuvering being allowed on the airways, it would reduce the hazard tremendously as far as not watching and seeing where he is going.

Mr. MINSHALL. I am not talking about the maneuvering on the airways specifically by the military in this phase of my question. I am talking about midair collisions between airliner and airliner.

Mr. FRANKLIN. Well, the adoption of the expansion of the air traffic control more specifically would improve that.

Mr. MINSHALL. But how long would it take to put that program into effect? That is a long-range program. It is going to take a lot more money, which I know Congress would be willing to appropriate; but above all, there is a time and space factor and we have to do something right now to stop these midair collisions.

Mr. FRANKLIN. We propose to lower the altitude from 18,000 feet to 10,000 feet for control of all aircraft July 1st.

Mr. MINSHALL. And that is all you propose to do about it at the present time?

Mr. FRANKLIN. That, plus the adoption—as you have there in front of you, yes, sir.

Of course, in both cases, we are encouraging that all the programs be implemented, be hurried and be speeded up as fast as it is possible.

Mr. MINSHALL. I do not think it is just a question of improving the control of these aircraft and lowering your ceilings for IFR flights, and so forth. I think it is going to take many emergency measures right now to do something about this—whether it be to put some kind of observer on these planes to take care of the blind spots, or what we are going to do. You have got to do something right now.

We cannot go on having one of these air crashes every week.

Mr. FRANKLIN. I agree.

Mr. MINSHALL. What would you think of the proposal to put some kind of an observer on a plane in a bubble, with some kind of periscope to look out over the blind spots, over the rear, out underneath?

You are always complaining about lack of cockpit visibility. Maybe you can put one of these bubbles on a plane and give the hostess something to do when she is not serving coffee. All it takes is two eyes to say "Look, there is a plane back there."

Mr. FRANKLIN. Well——

Mr. MINSHALL. Or is that going to be too much expense to the airlines, to go into something like that?

Mr. FRANKLIN. Irregardless of the expense, I do not believe that it would be structurally possible to build a bubble and put an observer in.

Mr. MINSHALL. They have bubbles on ships now. They have them on MATS Constellation ships, put some kind of thing you can push up when you slow down, coming into a congested area, so you can maintain a lookout over the rear.

If everybody were doing that, you would increase your visibility by 75 or 80 percent at least.

Mr. FRANKLIN. Of course I am not saying there is no merit in the suggestion at all, I do believe that——

Mr. MINSHALL. You do think there is some merit to it, do you not?

Mr. FRANKLIN. Oh, yes.

Mr. MINSHALL. Do you not think it could be accomplished, and accomplished much sooner than some of these other long-range proposals that you suggested here?

Mr. FRANKLIN. No, I do not. No, sir. I think when you take a modern pressurized airplane and change it structurally in any way, put a bubble or even an added window to it, you are not talking about just a short period of time; you are talking about a long period.

Mr. MINSHALL. I am not an engineer but——

Mr. FRANKLIN. Yes sir.

Mr. MINSHALL. It seems to me something could be worked out, either in some form of a periscope arrangement or something, that would give you additional visibility out of the blind spots, so there would not just be the cockpit visibility from the forward area.

Mr. FRANKLIN. What we have to do is not just the ones that can be seen and be seen; it is the ones that are operating under restricted visibility.

Mr. MINSHALL. But all these midair collisions have occurred in clear weather, have they not, by and large?

Mr. FRANKLIN. I was not under the impression that the Grand Canyon was in clear weather.

Mr. MINSHALL. I have the official report right here and it so indicates.

Mr. FRANKLIN. Between United——

Mr. MINSHALL. Yes, and TWA.

Have you read that?

Mr. FRANKLIN. Yes, sir. I was under the impression they were on and off instruments, though.

Mr. MINSHALL. Well, it was clear weather from all I can gather.

It seems to me they were operating under unlimited visibility.

If the pilots had been watching where they were going in that case, I do not think that accident would have occurred.

The trouble is they get there, they turn on their automatic pilot and eat a meal, or move around showing the people the Grand Canyon, whatever may have been that case—I am not too certain, but in any event the visibility was unlimited; and, if they had been maintaining a proper lookout, that accident would not have occurred.

Mr. FRANKLIN. Well, I brought Captain Smith along because he is flying the line regularly, and I would like very much, with your permission, to have him give his views on this subject.

Mr. MINSHALL. I would like to.

This is just one facet. I think we should leave no stones unturned. Whether it be more pilot vigilance, whatever it might be, we have to do whatever we can right now to stop these air crashes.

Mr. FRANKLIN. Yes, sir. We have done a great deal in that direction. We have taken as much paperwork as possible out of the cockpit and we have encouraged pilots—and that is part of our training—to always be on the lookout; always to be on the lookout.

Mr. MINSHALL. Well, the airline pilots said, when they testified before us 2 years ago, they just said you could not look out of the cockpits, when the instrument panel requires so much attention, and maintain a lookout.

Mr. FRANKLIN. That is right.

Mr. MINSHALL. I do not know if the captain would like to comment on it.

Captain SMITH. Yes, sir, Mr. Minshall.

By way of introduction, my name is J. D. Smith. I am an airline pilot for Capital Airlines. Also coincidentally I am chairman of the Airline Pilots Association Traffic Control Committee.

I do a little work in air traffic control.

Working backward on some of your statements, Mr. Minshall, the purpose in making the statement as referred to by Mr. Sand is due to the fact that with modern-day aircraft, there are many occasions where just through the normal operation of the airplane itself, the pilot is forced to be watching his instruments; and this fact by itself causes his direction to be inside the cockpit and precludes the possibility of maintaining outside vigilance.

We have attempted to overcome this basic requirement of the aircraft to some degree by having one fellow looking out all the time and having the other fellow actually flying the aircraft.

I cannot give you an official ALPA position on the program that Mr. Franklin has read concerning lowering the control procedures to 10,000 feet. I can very definitely say that we wholeheartedly subscribe to this program.

This is consistent with all our criteria, all the objectives that we have.

The only reason for not making an official position is because this just became available and I have not cleared this with our people. But I can assure you we have no conflict with the goal that is mentioned in here. We think it is a very worthwhile program.

There is one basic weakness to it, and that is that all this program does is reduce the possibility of two airliner aircraft coming together. This has been the problem facing us all along. But any of our efforts can only reflect actually a benefit to the airline industry.

One other point that you raised, Mr. Minshall, that I think actually is probably the cause of some of your concern, we as pilots wholeheartedly oppose any position that indicates that a "see and be seen" basis with our modern-day aircraft is a feasible operation. We cannot do it. We have said this for years.

The medical people have supported it. Anybody that has analyzed it has clearly pointed out that the present-day aircraft operate beyond the speed of the human capability of the eyesight.

We have no alternative but to lean more and more toward air traffic control procedures, ground-based equipment, to any kind of equipment or procedures which will provide us a separation that we cannot always maintain ourselves.

Mr. MINSHALL. I agree with you on what you say on the modern-day aircraft. It is physically impossible for pilots flying in opposite directions to react quickly enough to avoid an air collision, at the present rate of speed. What I am talking about is overtaking aircraft—such as happened over the Grand Canyon, such as happened over Indiana, Michigan City, Ind. I am talking about those two instances in particular where it was a question of a simple act of proper pilot vigilance.

Captain SMITH. If I may, Mr. Minshall, I should like to point out for your information that a survey completed by the CAA's evaluation center in Indianapolis—and we introduced this report at the hearing on this particular accident in question—clearly shows in the preface of the report that the most ideal setup for a midair collision was exactly the flight paths of the two airplanes involved in the Grand Canyon accident. The fact that the airplanes are approaching head-on, which of course reduces the time for action—it is not the only problem that needs consideration. There are many others entering into it.

We have on many occasions pointed out to us by tower controllers the presence of other aircraft. They pinpoint it for us. There are many conditions which enter into the picture which absolutely preclude the possibility of us being able to observe these other aircraft, even though we know exactly where they are. The controllers tell us exactly where they are. We are unable to pick them out with our eyeballs.

Mr. MINSHALL. Well, that is pretty much a case, then, for having another observer on the ship, is it not, to cover up these blind spots you cannot see from the cockpit?

Captain SMITH. The blind spots are part of the problem. The other part of the problem is that you can have six pairs of eyes up there and none of those eyes have the capability of doing what both you and myself wish we could do.

This is the reason we lean more and more toward the use of ground-based radar, more and more toward assistance of anyone that can help us maintain a separation.

Mr. MINSHALL. Well, do you maintain, then, in the case of the Michigan City crash—they just bumped and came apart fortunately—do you maintain that they could not see the other plane if they had been looking?

Captain SMITH. I think the report that has recently been released by the CAB points out that practically ninety-some-odd percent of these incidents occur when for all intents and purposes there is not a cloud in the sky.

I think this fact in itself clearly pinpoints the overall problem, regardless of the speed of the aircraft; but aviation in general just is faced with a most serious obstacle as far as relying on "see and be seen." These hundred-some-odd incidents do not refer solely to air-

line aircraft; these include all phases of aviation. This was a program that went out to all the airspace users.

Mr. MINSHALL. Do you think, then, that the TWA crash over Grand Canyon and the other crash we mentioned over Michigan City, Ind.—do you presume, then, that the pilots were watching where they were going and just did not see the other aircraft? Is that it?

Captain SMITH. I could only speculate in answering that, sir. But I can only, once again, go back to the work that has been done on this and say it has shown that a most logical occasion for such an incident to occur; it was exactly specifically in the closing courses that these two aircraft hit—regardless of the pilots and the utmost vigilance as concerns other aircraft outside their cockpits.

Mr. MINSHALL. I have a high regard for your testimony but I just cannot sit here and believe that two aircraft, one catching up on the other, gaining on him, on a clear day could not see him.

Captain SMITH. Well, sir, I will see to it that you will get a copy of the report where it is very clearly and pictorially shown exactly how it occurred.

Mr. MINSHALL. Well, in this official report, it shows that the Grand Canyon crash—they have got pictures of the cockpit and it shows exactly the view that the other pilot probably had of the other aircraft, how many seconds and minutes before the crash occurred. It would certainly indicate that the pilot was not watching where he was going.

Captain SMITH. Well, I am afraid we are just getting into areas of speculation here, sir.

Mr. MINSHALL. I am just quoting an official report—not speculation. That is all I have.

Mr. KILGORE. Captain Smith, does the Viscount airplane itself give you comparatively good visibility? I mean compared to the other craft.

Captain SMITH. Yes sir. The Viscount probably has at least as good if not one of the best outside capabilities of any airplane.

Mr. KILGORE. I had an impression, just from observing it from the ground, it appeared to have considerable glass area from which whatever visibility is available to you would be available.

Captain SMITH. Yes, sir; I had an occasion where if it had not been for the design of the window, I would have hit an airplane myself up in New York. I might add I was looking up pretty good.

Mr. KILGORE. Mr. Franklin, any further comments?

Mr. FRANKLIN. One further comment. We had a near miss about 2 years ago where the near miss was caused because the pilots did not see each other and the one pilot took evasive action that put him directly on the collision course.

We have many cases reported to us where they have seen other aircraft, but were unable to tell what direction and what altitude they were traveling in and did not know what course of action to take.

Mr. KILGORE. It is a difficult thing for human eyes to make the sort of computation to be absolutely correct.

Mr. FRANKLIN. Yes, sir.

Mr. KILGORE. At what point the course could be predicted.

We appreciate, Mr. Franklin, your coming up.

Mr. FRANKLIN. Thank you very much.

Mr. KILGORE. I wonder if we could take about a 2-minute recess before Mr. Pyle comes on.

(Whereupon, a short recess was taken.)

Mr. KILGORE. The committee is pleased to have the Honorable James T. Pyle, Administrator of the Civil Aeronautics Administration, and some members of his staff.

I had occasion to meet with you before and we are glad to have you back. We are glad you have the members of your staff with you.

STATEMENT OF JAMES T. PYLE, ADMINISTRATOR; ROBERT P. BOYLE, GENERAL COUNSEL; DAVID D. THOMAS, DIRECTOR, OFFICE OF AIR TRAFFIC CONTROL; AND JOSEPH H. TIPPETS, DIRECTOR, OFFICE OF AIR NAVIGATION FACILITIES, CIVIL AERONAUTICS ADMINISTRATION

Mr. PYLE. Mr. Chairman, we appreciate this opportunity to come up here and discuss with you this extremely critical situation with which we are confronted. I would like to introduce the gentlemen from the agency I have with me.

This is Mr. Robert P. Boyle, General Counsel; Mr. David D. Thomas, Director of the Office of Air Traffic Control; and Joseph H. Tippets, Director of the Office of Air Navigation Facilities.

In the interest of your time and that of the other members, I would like to briefly outline the situation as I see it today.

Now, can you hear me all right?

Mr. KILGORE. We can hear you.

Mr. PYLE. I think we must all recognize that for the past 4 or 5 years, we have had an extremely serious situation insofar as the handling of traffic in general is concerned.

The first area that required immediate attention, both from the standpoint of the air carriers, the airline, as well as the military, was inability to handle instrument flight rule traffic. There were serious delays incurred, both in military training missions as well as the air carriers themselves and I am sure all of us in this room are very experienced with this problem of being held at airports unable to get off, and so forth.

We have, thanks to the back-breaking efforts of the men and women of our agency and these two gentlemen on my right specifically (Messrs. Thomas and Tippets), to a large measure increased our capability. For instance, 2 years ago we were able to handle about 10,000 instrument flight plans a day, not too successfully in some instances but this was the order of magnitude. Now we are handling on the order of 17,000 instrument flight plans a day—only 2 years later. I think this is a significant increase in capacity.

Our problem, however, is that the traffic itself has increased at a fantastic rate. In fact, I would say it was an explosion to be more accurate, that would more accurately represent the nature of the increase in this traffic. As a result, we are faced with our inability to handle the numbers of aircraft that we would like to under positive control or instrument flight rules; and we are face to face with another problem, which is the one we are really discussing today: That is, the visual flight rule or good weather conditions.

The number of aircraft flying in the atmosphere today are on the order of perhaps 200,000 flights per day, both instrument and visual flight rules, good weather conditions. Now, take our capacity as being

somewhere in the neighborhood of 17,000, and ask us to handle 200,000, it becomes readily apparent that our system will break down and we will be flooded and we will not give the service to the military, to the air carriers, to the business, general aviation airplanes that require it.

So I think in response to the very evident concern that you gentlemen expressed and the specific concern that you have for what we are doing now to try and better the situation until we have a Federal airways plan implemented, I will outline very quickly some specific measures that we are taking.

Our approach is that this is a job that we must do cooperatively with the users of the airspace. If you go through the regulatory procedure, it requires additional time and we do not have that kind of time. So we are working out together, jointly, with the cooperation of all the users of the airspace—the airlines and the Airline Pilots Association, which incidentally has made a significant contribution, Captain Smith is a good evidence of this contribution the Airline Pilots are making; with the military services, specifically the Air Force and the Navy being those services most concerned; the Civil Aeronautics Board and the Airways Modernization Board—sitting around a table saying what are we going to do.

Now, let me just show you quickly some of the things we have already worked out as a program to follow and we shall shortly be implementing as fast as we can.

The first area that we are interested in achieving is an application on a limited basis and this I want to make crystal clear, of positive control in certain segments of the airspace; specifically, to control on a positive basis all aircraft at altitudes of 17,000 feet up to and including 22,000 feet on 1 transcontinental route between New York and San Francisco, 2 transcontinental routes between New York and Los Angeles with a spur into Washington, and 2 routes between Washington and Chicago.

Now, I have the specific routes and we will furnish the designations, the geographical designations to the committee for the record. I think it would take too much of your time to do more than just describe them in general.

This application of positive control will be expanded to cover other routes and provide protection for en route aircraft, but we must do so within the limits of our ability, within our agency, to be able to serve the users of those routes before we actually implement additional routes.

To be specific, we block a piece of airspace—and this is what we are doing—to any but instrument flight rules across the country. Not only must we be able to handle those aircraft that want to go to and fro on that airway, but we must be able to permit others to cross if they want to cross at specific altitudes between 17,000 and 22,000 feet.

Now, the reason we picked only 6,000 feet, actually 6 different altitudes, is that this would permit good weather conditions. Certain aircraft, if they wanted to go through this blocked airspace, ought to go up to 2,000 or 3,000 feet.

This will, in effect, provide an area in which the air carriers and military aircraft wishing to take advantage of this blocked airspace in effect can do so and let the others go around, underneath or, if they must clear, go through with positive assurance that there will be no

aircraft in any way endangered by their going through, other aircraft proceeding on the airway.

Now, this is the first positive step that we propose to take.

Incidentally, I must point out that this requires a regulation by the Civil Aeronautics Board and it requires extensive charting. It will be necessary to distribute the information to the two hundred thousand-odd pilots that fly in the United States—military, civil and airline—so that all concerned are informed that this is a blocked highway in effect.

Mr. PLAPINGER. That would not have had any effect on the crash that occurred Tuesday, Mr. Pyle.

Mr. PYLE. That is quite correct, yes. This is an altitude of 17,000 to 22,000 feet. Our objective, quite frankly, gentlemen, is to take the first step in segregating jet aircraft from piston-pressurized operation.

This is the area that the great majority of the aircraft of the piston type, and which we are now using for passenger air traveling today—20,000 feet is the economical operating area.

Mr. PLAPINGER. Has any analysis been made of where the midair collisions take place with a view to correcting that situation if it is show that a pattern exists?

Mr. PYLE. Mr. Thomas may wish to supplement my statement, but I would say that the area in the neighborhood of 21,000 feet is the area of our greatest exposures, and this is what we are trying to take care of by this device.

Now, I think it was a fact—and Mr. Minshall may be able to correct me—but I think it was estimated that the accident in Grand Canyon was at 19,000 feet, or 21,000.

Mr. PLAPINGER. 21,000 is my recollection; I am not certain.

Mr. PYLE. Well, the other accident I have in mind was the Nellis Air Force accident—airbase at Las Vegas—21,000 feet. In other words, this is an area not only in which we have had two incidents, but it is the area in which we are most exposed because of previous dominance of airline traffic at that altitude. We want to protect it. It is the objective——

Mr. PLAPINGER. What can be done to avert the sort of situation that happened last Tuesday?

Mr. PYLE. Well, this is the next step that I want to come to. I think this will begin to unfold and I think we can give you specific answers, depending on the program we lay before you.

The second step that we do wish to initiate is that of segregating in effect military and civil traffic, or the traffic using the Federal airways, because it is not all civil by any means as I am sure you are well aware. I am talking about the military operational training traffic from the Federal airway traffic. This can be done by a number of devices. Now to save time, I will just read them off.

We would establish this segregation of military training operation from enroute operation—those operations proceeding on the Federal airways in all locations where it is feasible.

What we have in mind is trying to segregate the following types of operations: Air-to-air combat training, acrobatic, air and ground gunnery, rocketry and bombing, flight testing, sonic boom areas, interceptor training.

Now the point that I make here is that this type of traffic is very difficult from our standpoint to control. So it is our feeling that we

should move to the extent we possible can into special areas and build fences around them, and let them operate in their own pasture if you want to call it that.

It is the restricted area concept.

It would be our feeling that the military is entitled to this training activity. They must do it to meet the requirements of the Military Establishment, and we must provide airspace for those who wish to do this work and keep them away from the traveled highways.

Now, we would have to determine by various means at our disposal, geographic description, rivers, or something else, navigational aids, sufficient to delineate these areas so that there would be no danger that the pilots as they were doing their missions would slide out of them and get into a Federal airway.

This is a problem. This is one of the situations we must take care of. We must also be able wherever possible to survey the use of these areas by radar to insure that they would not slide out also. We must insure that we only block those altitudes that are needed for the training mission. We do not want to use up airspace unnecessarily.

Airspace is a vanishing national resource. I think we are all fully familiar with this problem. So we should only use those altitudes that are needed in order for the military to accomplish their specific training missions.

I think we would make every effort to fit the areas into the existing airway and off-airway structure to obtain minimum interference. But, by the same token, we may have to adjust the airway structure in several instances to bring them around these restricted areas.

This is a problem and I take encouragement from the standpoint of testimony and the statement that has been made to me by Mr. Paterson of United Airlines, who says, "Look, we will be glad to fly around these areas if it is going to help your problem, even though it does cost us more money."

Now, we do not mean by that that we are going to impose an unnecessary burden on the airlines; but they will also have to give a little.

The military may have to give a little, to fly further to get into a restricted area. This is a problem we will all have to work out, give and take, to compromise and come up with the right solution.

Another device we will use is to provide reserved tunnels, in effect, for high volume traffic proceeding on crossing airways. This may mean we may have to in certain instances block airways so a tunnel will be provided for high performance aircraft to go through the airway.

We would not use those altitudes at any time, or at least in those times which we knew they were being used.

Now, the same device might be used also, going back to the restricted area concept. We may, if we can schedule the use of these areas, be able to work out with the military commanders involved certain times when these restricted areas would be used for the accomplishment of their mission, but they would be, let us say, during daylight hours. During the nighttime, there would be absolutely no problem to let traffic—military and civil—go through this particular block of airspace, provided we were assured that there was no possibility of a conflict, that there was no requirement for a training

mission at night. If there were, we would not permit it. In other words, I am talking now about the scheduling of activity in the airspace. This is another device we must use in order to gain better use, more efficient use, of this national resource.

Mr. PLAPINGER. What is the time element involved here?

Mr. PYLE. Well, I think by "time element" you mean how soon we can get all these things into effect. I think some of them are already in effect. To be specific, we have already with the military worked out a new procedure at Nellis Air Force Base. Some of the others will be going into effect shortly. Others will take a longer time. To come back to the point, Mr. Plapinger, we have to be sure that all segments of aviation are informed, because there could be nothing worse than to come out with a procedure and in effect drive somebody into a dangerous situation for lack of information. It requires distribution of charts, distribution of information. Some will take longer than others. I would say, to take a ball park figure, I would hope most of the program we are talking about would be in effect to a greater or lesser degree within 90 days. It may take longer, and I may have to come back and tell you it is 6 months. But it is somewhere between 3 and 6 months that we will have most of this program in operation and in effect implemented.

Mr. MINSHALL. Mr. Pyle, you say this program is going to take 90 days. Would it accomplish anything, in your opinion, to restrict to some degree at least some of the military training flights during that period until this program can be put into effect?

Mr. PYLE. I think my answer will have to be twofold. In the first place, the Congress has given me a mandate that, in any action I take, I must take into account the full consideration of the requirements of national defense, so that whatever action I take I must work out with the military.

Now, the second point, and I think this is the important point, is that, unless a rule is passed by the Civil Aeronautics Board, I would have no authority to ground any aircraft. So I do not have the authority right at the moment.

Mr. MINSHALL. Well, if you did have the authority, do you think it would be a recommended procedure to cover up this lapse of 90 days' time? I mean something that could be put into effect in the next few days.

Mr. PYLE. It could not be put into effect in the next few days—all of the things I am talking about.

Mr. MINSHALL. I mean of restricting certain aricraft in their flights, specifically some of the military training flights.

Mr. PYLE. I don't think in that instance—in certain areas, Mr. Minshall, I would be carrying out my duty to take into account the requirements of the National Defense Establishment. In other words, I am in agreement with the gentleman from the guard who says they have a training requirement and they must meet it. I think the solution to the problem is how to meet it without endangering civilian traffic. And I must be realistic in pointing out to you that we don't get there overnight. We have been much concerned with this problem. We have been working on it. I will also be frank with you; we have been working on it at an accelerated pace since this thing became so serious during the last few days. Nevertheless, the fact remains that

we have not been idle in this area, and this is not something that one does by pushing a button and saying, "Here it is."

Mr. MINSHALL. You don't believe there is any stopgap or emergency measure that you could put into effect in the next 48 hours?

Mr. PYLE. I will have to ask my good General Counsel to qualify my statement, but I think the answer is, unfortunately, that I would have no such power actually to do so. Now, if the Military Establishment says that in certain areas they will voluntarily reduce certain flying, we will cooperate with them and help them in any way we can. But I could not order them to do this.

Mr. MINSHALL. Do you think that would be a good idea, if they did suggest something like that on a voluntary basis?

Mr. PYLE. This is something I believe in fairness the military must answer themselves. And I believe you intend to have them before the committee.

Mr. MEADER. Mr. Chairman.

Mr. KILGORE. Mr. Meader.

Mr. MEADER. Mr. Pyle, on April 1, 1958, the Board issued Civil Air Regulations Amendment 60–9, delegating to you as Administrator certain additional authority with respect to airspace control. And as I understand it, only under certain conditions will military flights be permitted to deviate after the effective date of that regulation. Now, what has been done since April 1, 1958, to carry out this order which would restrict somewhat the wide discretion that the military had over their flights and deviating from your flight traffic rules? Could you tell us just what the status of that is?

Mr. PYLE. In actual fact, Mr. Meader, the military must fly in accordance with the Air Traffic Rules, and they do so. Now, I must at this point point out that the Air Traffic Rules permit two different types of flights, VFR operation and the IFR operation. The military have not taken advantage to any great extent of this right of noncompliance. This is the point. They have not abused this privilege excessively. The point is now that they cannot do so. They must come to me with a waiver in order to permit operations which are not in conformance with the Civil Air Regulations. But I think the basic problem that we are all sitting here and being equally concerned about is the problem, as I believe the ATA put it in their release, of a mixture of VFR "see and be seen" traffic with IFR traffic which is under positive control. This is the problem. And I believe this new authority that I have, which is twofold—first, not to permit the military to just go off without an order of noncompliance—but I will say, frankly, they have not abused this to any great extent, and certainly to my knowledge——

Mr. MEADER. Well, are you saying now it was unnecessary to issue this order?

Mr. PYLE. No, sir. Don't misunderstand me. This is a great improvement. But in fairness to the military, they did not abuse this privilege to any great extent. But I think the important——

Mr. MEADER. What I would like to know, was this self-executing or were other things supposed to be done to carry out the policy contained in this order of April 1, 1958?

Mr. PYLE. I think there are two points, and I want to be sure—if Mr. Boyle will correct me—Mr. Meader, there are two points involved

in this particular item to which you speak, the first being the question of noncompliance, which now requires a waiver. They must come to me for all Bureau operations which are in the interests of national defense, and which I would certainly not want to in any way inhibit. If they have to go out and scramble to intercept a hostile airplane, I would be the last one to want to inhibit this. The second point is the whole matter of the handling of airspace. And this is the important thing, and this is right now in operation. There were 2 points, in other words, or there were 2 phases to the regulations promulgated by the Board; and the second one is the handling of airspace, designation of restricted airspace, designation of airways, high-density zones, and so forth. It is now my responsibility to carry out this, and this is going to move much faster than it ever had before.

Mr. MEADER. Well, now, maybe I simply am not familiar enough with the technical aspects of these regulations and the order. I was somewhat surprised to hear the military witnesses this afternoon testify that they did not even know that such an order had been entered by the Civil Aeronautics Board on April 1 and that they had received no instructions on any change with respect to their flight operations as a result of the order of April 1. Now, shouldn't they have received some instructions? Are they aware that there has been a change, or do they need to be aware that there has been a change as a result of that order of April 1?

Mr. PYLE. Mr. Meader, they must continue to operate in accordance with the Civil Air Regulations and the only instance insofar as the order of noncompliance is concerned—this is the only area in which they would in any way be affected by this new rule. They do not carry on those operations at this point, so therefore their present pattern of operations is identical to all intents and purposes, with what it has been heretofore.

Mr. MEADER. I notice in this document, it says in the second sentence, the first paragraph:

> The present regulations, section 60.1(a), permit the military aircraft of the Armed Forces to deviate from the air traffic rules when appropriate military authority determines that noncompliance with this is required.

Now, of course, I do not know what "appropriate military authority" is, but the colonel of the Maryland Air National Guard apparently knew nothing about this order. I do not know whether he would be an "appropriate military authority" to permit deviation from your rules.

He is still here, I understand.

Mr. PYLE. Well, I think, Mr. Meader——

Mr. KILGORE. Colonel, do you have any comments you want to make with respect to Mr. Meader's question?

Colonel WARFIELD. Sir, if I can help clear up the point, we never deviate from the CAA regulations. And I think the one point is that, if the United States Air Force told us to take our jet fighter squadron and take it over the ocean and go down to 10 feet and strafe, that would be below minimum altitude and, if I got an order from the people that give us our training orders to do that, that would be proper authority and we would deviate. But from our experience, we have not deviated.

Mr. KILGORE. Thank you.

Mr. PYLE. I do not think I am being very helpful, Mr. Meader. The point here is that there was always the danger, the way the rule was initially written, and this is the problem with which we were faced, that if in the administration of, for instance, the designation of a new airway, the military would have had the right under the old rule to merely send in a notice of noncompliance. And then our airway, to all intents and purposes would have been valueless. Now, we have nailed this one down and they do not have this right. They must come to the Administration for a waiver. This is the important point that is involved here. But I will say in all fairness that the order of noncompliance was rarely if ever abused by the military services.

Mr. PLAPINGER. Mr. Pyle, noncompliance without waiver is only authorized under this rule when it is required by military emergency or current military necessity essential to the defense of the United States?

Mr. PYLE. That is right, that is under the new rule.

Mr. PLAPINGER. It is just not something that has some vague connection with the national defense; this is tantamount to——

Mr. PYLE. An intercept mission might be a good example.

Mr. PLAPINGER. An intercept mission involving some war game or an intercept mission involving enemy planes? The way this is worded, it looks like this requires a national emergency——

Mr. PYLE. That is right.

Mr. PLAPINGER. Tantamount to war.

Mr. PYLE. I think this becomes a little difficult to pin down. Under national-emergency conditions there might be noncompliance. In other words, the Air Defense Command has to scramble when there is an unknown plane approaching our shore or coming over our borders. This would be——

Mr. PLAPINGER. This would not just be defense maneuvers.

Mr. PYLE. No, it is not intended that this be used just for training maneuvers. In other words, to give a good example, if there were a training maneuver involved, then they would come to us for a waiver. This can be foretold. When there is an intercept mission, a hostile aircraft involved, then they have the right, and no one will deny them that right, to go ahead.

Mr. MEADER. Mr. Chairman, I have another subject that I want to take advantage—I don't know whether I will get a chance to ask Mr. Pyle this question again in the near future.

In our hearings 2 years ago, Mr. Pyle, in June of 1956, on pages 379 to 382, I had a colloquy with Mr. Howell of CAA and Mr. Lowen, your predecessor, concerning the planning of airports and the separation of major airports from each other in the light of the use of jets by commercial airlines. Mr. Lowen said, and I am quoting from page 381 of the hearings, that—

> The Civil Aeronautics Administration was acquiring two jets, a Boeing 707—

I believe some other—well, anyhow—

> for the purpose of making this study to see what flight patterns and approach patterns would be appropriate when commercial jets were used, to determine whether or not the separation of major airports under the rules established, I think, way back in 1948 or 1949, by CAA could still be valid when jets were used extensively commercially.

And I asked him this question:

I wonder just when you think this study will be completed, Mr. Lowen, so you will have some idea about these criteria?

Mr. LOWEN. As I said yesterday, we start next morning training our crews. We should have a B–47 in operation within approximately 6 weeks after we receive it, which should be this morning. And then we have got to pull in all our radio gear and get it in operation; and as soon as we do that, have our problems worked out, we will bring in the B–47 type operation and I would assume that in 6 months we will have many of the answers to the problems that are posed here today.

What I would like to have—and I know you are not prepared to present it to the committee today—but as soon as possible, I would like to have the results of that study. I have been following, or trying to follow, the Jet Age Planning Reports or whatever it is that you get out from time to time—I think I have seen three issues of it—and in each case I looked through the discussion which pertained to airports and found nothing which indicates that, when the jets are used commercially, whether they will be as near each other as they are today or whether the airports should be farther apart. And I would like to have the results of the study Mr. Lowen referred to, if they are available in any form. I don't know, maybe you have some information you can give right now. If so, I would be happy to have it.

Mr. PYLE. I would like to point this out in answer to the question. Then I think what we should do is to furnish the committee a carefully prepared statement on this point, because it is a good one. Basically, however—unfortunately, as you remember, Mr. Lowen died—the B–47 program was never implemented, for very good and valid reasons, not the least of which was the inability to get such an aircraft from the Air Force or to be able to maintain it. It is a highly complex piece of equipment and it is a very expensive piece of equipment to operate. In the meantime we did get two B–57 jet aircraft which are much smaller, but those have been devoted entirely to the flight inspection activities under Mr. Tippets, at high altitude, because we found such a crying need in this area.

Now, I do not mean to indicate by this that we were not responsive to the very problem that you mention. However, we find the best technique under which to study this kind of a problem is by the use of our simulator at Indianapolis. I think you may have heard us talk about this. In other words, we can simulate electronically and with the use of certain techniques, aircraft operations of any kind—jet, military jet, civil jet, airline, and so forth. And what we do now is to study various complexes in great detail as to just what is involved in the operation of the civil jet, which is much more satisfactory than having to go out and fly the thing and disturb the whole neighborhood by flying around, making approaches at low altitudes——

Mr. MEADER. I know probably your airport man is not here and maybe you would not want to answer this question, but have you come to any conclusion about the distance that major airports should be separated from each other in the light of the use of jets by commercial airlines?

Mr. PYLE. I think the answer, Mr. Meader—and on this we will supplement with a more detailed statement—is that each airport, each

community, or each set of airports in each community, is a study in itself. The patterns of the airways are such that you cannot lay down any criteria. Now, the Curtis report, if you recall, did come out with a theoretical figure of 16 miles, if I recall correctly; but this in actual fact might be too close under certain conditions and too far apart under other conditions.

Mr. MEADER. Well, you will provide the committee with this statement?

Mr. PYLE. We will.

Mr. MEADER. I did not mean to go into this in great detail, but I have one other point I would like to discuss with Mr. Boyle, and this bears upon this matter of positive control.

It is my understanding—and I want to have this confirmed by someone who knows more accurately than I do—that when you have positive control of flights by the Civil Aeronautics Administration, when an accident occurs there is a liability on the part of the Government if there has been negligence, or some kind of omission or commission on the part of the personnel of the CAA, which gives rise to an action by the injured parties under the Tort Claims Act. I understand there have been substantial sums paid in settlement as a result of the crash between the jet and the Eastern Airlines plane over the National Airport when the jet was being flown by a Bolivian pilot. I would just like to have some understanding of what we are letting the United States Government in for in the way of possible liability for damages in the event that this positive control which everyone seems to say is the answer to the problem is actually inaugurated. Just what are we faced with, Mr. Boyle?

Mr. BOYLE. Well, Mr. Meader, you are perfectly right. We have been held liable for negligence arising out of the actions of our air traffic control tower operator in the particular accident you refer to. That is the one that involved Eastern Airlines and a Bolivian pilot operating a P–38 belonging to the Bolivian Government.

Mr. MEADER. What was the magnitude of the liability of the Government with respect to that accident?

Mr. BOYLE. Well, we, the Government, had the advantage of the fact that our negligence occurred at the control tower where the operator was stationed, which was in Virginia. That gave us the benefit of the wrongful death statute of Virginia which limits our liability of $15,000 per passenger. There were some 55 passengers on board that airline; and assuming that each one of them is able to prove that his damage was in the order of $15,000, which so far, I believe, has proved to be the case, multiply $15,000 by 55 and you will get very close to $800,000.

Now, this is a very real problem. We have at the moment—I haven't made an accurate count, but we have somewhere on the order of 100 civil actions filed against us in various courts of the United States, for damages arising out of alleged negligent acts on the part of our personnel. The case of Eastern Airlines' accident—the citation of the case is *U. S.* v. *Union Trust Company*. It's in 221 Fed. 2d 62. It was affirmed by the Supreme Court in 305 U. S. 907. That case, of course, was a leading case, an outstanding case; and as a result of that, I think that we have been subjected to many suits. The 100 that I speak of is indicative of the number of actions that have been brought against us.

Now, these are initial complaint actions only and I don't believe we were negligent in all of these accidents by any means. We are working with the Department of Justice in the defense of these actions. We have been successful in one or two. Incidentally, one in which we were successful did not arise out of an air traffic control problem at all; it was a certification problem rather than an air traffic control problem.

Mr. MEADER. Now, these suits were all personal damage suits for deaths of passengers. The airline didn't make any claim for loss of its plane?

Mr. BOYLE. No; the airline made no claim against us in the Eastern Airlines accident. As a matter of fact, we were joint defendants.

Mr. MEADER. Now, I am concerned, as a matter of principle and policy, about this matter of positive control. First of all, our usual way of regulating people is to say, "Don't do this; and if you do, why, we will punish you." But where we actually direct and order an individual to do things, it is a little different type of governmental operation. And I am concerned about the liability, and I am also a little bit concerned about the philosophy of ordering things rather than saying, "Here are things that are prohibited, but outside of that area of prohibition, you have complete discretion and you are a free individual." Do you see the possibility, if we go in this direction of positive control, of extensive financial drains upon the United States almost as an insurer of the individuals and the property being directed by the Civil Aeronautics Administration personnel?

Mr. BOYLE. Congressman Meader, it is a very real problem. I'd like to point out though that we are already in that position. Under the current Civil Air Regulations, when instrument conditions exist, aircraft are required by the Civil Air Regulations to operate in accordance with positive air traffic control exercised by the CAA. Consequently we are already in that position.

I think that the point you make serves to emphasize the fact that we should not undertake positive air-traffic control until we are equipped and able to provide the kind of service that the military, the civil airlines, the executive aircraft, and the general flying public are entitled to receive. It would be an unwise thing for us to attempt to exercise positive control when we are not equipped to do it, cannot do an adequate job, and unnecessarily not only expose them to risk but expose ourselves to ensuing liability.

Mr. MEADER. By the way, Mr. Pyle, have you explored any alternatives to positive control? I mean, is that the only force we have for regulating air traffic in such a way as to avoid collisions?

Mr. PYLE. Mr. Meader, I would like to be responsive but I think Mr. Thomas is so much more acquainted with this problem than am I from a technical standpoint that I think he could better answer your question.

Mr. THOMAS. Yes, sir, Mr. Meader, we have explored virtually every alternative. In fact there are two. One alternative would be to put some equipment on the airplane which would alert the pilot to the presence of another aircraft. So far nothing in that direction has been successful, although there is a lot of work continuing on that.

The other alternative——

Mr. MEADER. May I ask at this point, Mr. Thomas, whether there have not been proposals about an altimeter which could automatically show the direction at which a plane should fly at a particular altitude so that you do not have a conflict—I take it, now, your flights east and west are separated a thousand feet apart, one is at the odd thousand and the other is at the even thousand. Isn't that correct?

Mr. THOMAS. Yes, sir.

Mr. MEADER. Do you have similar separation of north and south traffic?

Mr. THOMAS. Yes.

Mr. MEADER. There have been suggestions made—I happened to run across it—I just would like to know what information you have on an altimeter which would automatically have a greater sensitivity and indicate directions in which traffic should fly at various levels?

Mr. THOMAS. There have been, to my knowledge, over the past several years, this same proposal or variations of it, which is essentially a compass-piloted altimeter to assume a minute change of altitude depending on the exact reading of the compass. This is a refinement of the present instruments which give some altitude protection. It gives the finer details. However, the big problem is the climbing and descending traffic as well as the traffic that is maintaining level flight. We have not felt that this is an answer to the problem, and this required very accurate altimetry and very accurate flying in order to make it effective.

The other alternative that we know of it the one that we are using now; and this is a VFR, "see and be seen," where we use the rules of the road the same way we do on the highway, depending on the operator or the pilot to see and observe other traffic. Once we get to putting electronic devices into the airplane, which are not available and probably will not be available for some years, or we reach the point where we feel we cannot depend on human vision to do this job, due to closure rates, for example, the only alternative we know is to provide the traffic assistance that is needed from the ground, with radar and with communication, or in the absence of radar, by giving rather extravagant blocks of airspace to each pilot in order to keep them separated. These are the only three things we really know of to do.

Now, we can help; and we are assisting procedurally, organizing VFR traffic rules, clearance of altitudes, crossing points, and various procedures and things; but these are just a matter of agreeing. Fundamentally it looks like we have to get some assistance from the ground.

Mr. KILGORE. Mr. Pyle, I told you we would try to get through with you today, which we will try to do. Earlier you mentioned, I believe, your daily flow of IFR flight plans is 17,000 on the average, if I understood you correctly.

Mr. PYLE. This is about the daily average, yes, and about the capacity of our system.

Mr. KILGORE. Then I believe you said also there are approximately 200,000 flights, total flights of all types, domestic flights in the United States each day.

Mr. PYLE. This is pretty much of an estimate, Mr. Chairman, because a lot of it—we are not entirely accurate, for instance, on military use. Local flights move on their own basis.

Mr. KILGORE. As you move from your capacity of 17,000 toward whatever would be the ultimate in the necessity of controlled flight plans for positive control, what are your principal limiting factors that would prevent you from being able to handle this increased volume? Is it primarily personnel, primarily equipment? Is it an entirely new technique that will be required to handle thirty or forty or fifty thousand flight plans? If you could tell us briefly—if it can be answered briefly—what those limitations are——

Mr. PYLE. Yes, sir; it can be. The limitations are perhaps in three general areas. The first is in the matter of radar equipment. This gives us the ability in effect to see much farther out into the airspace, either in a high-density area or along an airway. Otherwise, as Mr. Thomas has previously pointed out, we have to use time separation which, in a jet, 10 minutes of time amounts to as much as 100 or 150 miles.

The second area is ability to communicate with the pilot, and this involves extensive communication networks in terms of transmitters and receivers on the ground which enable the pilot, wherever he may be, to communicate with one or another of our 29 air-traffic control centers. Now, this is a very, very extensive communications network. And, of course, the key to the whole situation is the recruiting and training of personnel.

And the very factor that Mr. Meader mentioned, of the liability that we incur, imposes on us an obligation to have perfect, or as near perfect as we can make it, operators. Because if—for example, we have 11,000 of them right now in the system; we are building them up continuously. If each 1 of them makes even 1 mistake a year, you have 11,000 mistakes. Now, the point there is then that we cannot put these people into the system overnight. We must recruit them; we must select them carefully, to be sure that they are psychologically and have other aptitudes for this very intensive type of operation. And I think all of you gentlemen are familiar with the difficulties the controller has. Then we must train him, a 2-year course, before he is a controller, and another 6 months on top of that before he is a radar controller. So you have 2½ years from the time you hire John Doe until he is an active radar controller. The same thing goes for radar and other equipment. It takes time to select the type of equipment you need, type of specifications, buy it, put it into the system, flight check it and have it in operation. It is a lengthy process. We are well along the way, however. In fact we are operating at an accelerated pace in the implementation of our Federal-airways plan, which I think is available if we have not given the committee, through Mr. Plapinger, copies of it. I think you have them.

Mr. KILGORE. How extensive is your radar surveillance now? Is it now restricted to the major metropolitan areas and the control centers around the major airports?

Mr. PYLE. Mr. Thomas can answer that better than I.

Mr. THOMAS. Insofar as the long-range radar is concerned, it is just coming into being. Actually we have long-range radar operat-

ing in New York, Chicago, Washington, Norfolk; and we are using very little radar so it is very scanty. It has just come into being at the present time.

Mr. PLAPINGER. This was ordered, when, Mr. Thomas?

Mr. THOMAS. All of these that are mentioned are military equipment that were furnished us by the military. The new equipment that we are ordering under the Federal airways plan are right now being delivered and the first installation that has been made, I don't know whether it has been flight checked at Indianapolis——

Mr. MEADER. When did they make it?

Mr. TIPPETS. They were authorized in the 1957 appropriations, some 23 we ordered, in the 1957 appropriation. And we have authorized now, at the present level that the House Committee on Appropriations has authorized to us, we will have some 56 long-range radar of which 40 will be in operation by July 1, 1959. We will have 4 additional ones over and above the 4 we now have, operating July 1 of this year; and they will come into operation as the months go by and 40 totally will be in operation by July 1, 1959.

Mr. PLAPINGER. When all of the 40 are in operation, will that blanket the country at that time?

Mr. TIPPETS. No, sir. This is going to take somewhere in the vicinity of 100, possibly more. We are working very carefully with the military, making joint use of their radar as well as the radars we have. But we expect it will take in excess of 100 long-range radar to blanket the country at 15,000 feet, which is practically our goal for the national long-range radar system.

Mr. KILGORE. In this accident which occurred Tuesday, that we were talking about earlier, could that particular area of air space, assuming about 8,000-foot elevation in that area, could it have been under surveillance by any existing equipment, equipment in being now?

Mr. THOMAS. Mr. Chairman, the Capital Airlines was under surveillance at all times within the area, because we have here at Washington a World War II type radar which has some deficiencies but it will handle a lot of traffic. Capital Airlines did show on this and was a good target. Immediately before the collision, the radar operator noticed either noise, interference, or a weak target. He was not sure because it was ill defined. He called Capital immediately and, while he was in the process of calling the airplane, the radar target expanded in size as it would by reflection due to the collision and it was observed.

Now, we would not normally see a T–33 at this rate, but occasionally we do. We might if he were to turn or give some other good reflections; but straight on with a T–33, we would not expect to see him with this radar equipment.

Mr. KILGORE. That's what I was fixing to ask him. The type of equipment that has been ordered beginning with 1957 authorization under appropriation, with that type of equipment, would they have been able to observe and to track T–33 aircraft at that distance?

Mr. THOMAS. The specifications call for it to do so.

Mr. MINSHALL. May I ask a question at that point. Would you be able to communicate with the aircraft involved, in time to avoid a collision?

Mr. THOMAS. We were in direct communication with Capital ever since he entered the Washington control area; that is, as he reported over the area which is the other side of Martinsburg, at all times. Given enough time, on seeing a target that was converging, we could have communicated with Capital. We have no record of communication dealing with the center or anyone else with a jet——

Mr. MINSHALL. What do you mean by "enough time?"

Mr. THOMAS. If the target had been seen other than just instantaneously before this—and we are not sure whether we saw noise or the T–33; we think probably it was the T–33—but had it been seen soon enough to determine its course and warn Capital, the one we were in communication with, of a target approaching from some direction—of course, we don't know altitudes; all we know is the azimuth, the direction. We do this many, many times. We point out much traffic to pilots that they don't see. And I can testify, or any pilot can testify, that radar frequently can tell us of targets we never would see.

Mr. MINSHALL. Would you consider that this T–33 was on a collision course prior to the time he turned?

Mr. THOMAS. We do not know; we did not see it, sir.

Mr. MINSHALL. Assuming he was on a straight course and he turned, when would you consider the T–33 to be on a collision course? This is a hypothetical situation. When would that T–33, if you had observed it on the radar, when would you have considered it to be on a collision course?

Mr. THOMAS. The radar standards are within 5 miles.

Mr. MINSHALL. Anything within 5 miles.

Mr. THOMAS. Within 30 miles of the antenna, anything less than 30 miles of the antenna; and this is——

Mr. MINSHALL. How long does it take a T–33 to go 5 miles?

Mr. THOMAS. About 45 or 50 seconds.

Mr. MINSHALL. Suppose it was on a head-on course. How long would it take to go 5 miles?

Mr. THOMAS. Thirty seconds, perhaps.

Mr. MINSHALL. Would that give you time to warn them?

Mr. THOMAS. Yes, sir; on direct communication.

Mr. MINSHALL. Well, as I understand it, the jet was not in communication with the traffic control center in Washington at all, was it?

Mr. THOMAS. No, sir; VFR had no requirement for it to be, and it was not.

Mr. MINSHALL. Could it have been? Did he have the equipment in his plane to be in communication?

Mr. THOMAS. Yes, sir; I believe the colonel testified he had UHF equipment; and we have UHF equipment in the center, which is 301.4 megacycles. And there is that capability. Had he been on IFR authority, he would have been required to have done so.

Mr. PYLE. I think, Mr. Chairman, this brings up two points I think we should clarify. First, the specific equipment to which Mr. Thomas refers, World War II, at MDW down here at Washington, will be replaced by a new radar this fall; and had there been then, the situation might well have been avoided. This is one of these unfortunate situations. The new radar would have been able to track the T–33.

But the point, Mr. Minshall, was it a head-on course—this is the easiest kind. If there was a plane at 10 o'clock, 11 o'clock, 12 o'clock——

Mr. MINSHELL. Then the see-and-be-seen rule applies.

Mr. PYLE. It applies to this extent. We facilitate the pilot to pick up in the airspace the target we see on the radar; and we then give him information, vector him around. And we also give him information—"You have traffic ahead of you."

Mr. MINSHALL. But the Airline Pilots Association, according to testimony they gave us 2 years ago, and what the Capital Airlines replied today, was that they might as well do away with the cockpit windows and fly completely blind all the time.

Mr. PYLE. I don't believe that was really exactly what Captain Smith had in mind. He points out that even this has deficiencies, but this is an area of improvement and it brings up the third point I would like to make. And that is this: We are working hard on setting up a traffic advisory service for good weather conditions which would be just the type of thing we are talking about. In other words, you take off in an airplane, not on instrument rules but in good weather, from Washington. You will be switched to a certain frequency and will be given information, other airplanes in your area that you must watch out for as you depart from a high density terminal area.

This we must do through the use of radar, and this program is now well into tests at Indianapolis jointly between ourselves and the Airways Modernization Board. I hope the test will be successful and we will be able to implement this program in the very near future, as soon as we get the equipment and get it installed. But this is the kind of thing that has tremendous value, in my opinion, particularly in the high density areas.

Now, I think the last point that I would like to emphasize is that, in addition to everything else, there is a very active accelerated program research through the Airways Modernization Board and sponsored by them for an anti-collision device which would be some form of electronic or other device warning the pilot "There is an airplane in your vicinity; look out"—ring a bell, or hit him over the head or something.

Mr. KILGORE. A proximity fuse.

Mr. PYLE. Something like that. But it would be either adoption of the radar technique or infrared technique or something. The Airways Modernization Board has this under top priority, and I can assure you we are working on that.

Mr. PLAPINGER. Would a plan for for positive control, Mr. Pyle, require amendment of the Civil Air Regulations?

Mr. PYLE. You mean for good weather conditions? The answer is affirmative, yes.

Mr. PLAPINGER. Positive control such as you have outlined before. You outlined a number of steps that would be required to bring all aviation under positive control.

Mr. PYLE. In a great many of the steps, we have sufficient authority to move right now. In others we would require regulations by the Board, which I am sure it would take us no time to get.

Mr. PLAPINGER. Could we have something for the record indicating the areas upon which you can move on your own motion and those areas which require amendment of the Civil Air Regulations?

Mr. PYLE. Could you speak to that now, Pat, or should we furnish it for the record?

Mr. BOYLE. Some of the areas that we could take action in now, under existing regulations, are in the establishment of additional restricted areas to segregate the jet traffic that Mr. Pyle referred to earlier. The Board has already delegated to us in the regulation that Mr. Meader cited a while ago, authority to establish restricted areas in which we would take action to fence off——

Mr. PLAPINGER. Do you have to follow any procedures? Have you set up some sort of hearing procedures?

Mr. BOYLE. Oh, yes. Yes, these are regulatory procedures. We have to follow the Administrative Procedures Act in the adoption of the regulations.

Mr. PLAPINGER. That is my point when I say moving on your own motion; I mean promulgating the regulation to be effective tomorrow. Or do I gather now that, in the promulgation of any such regulation, you must conform to the provisions of the Administrative Procedures Act?

Mr. BOYLE. Well, we would unless we could announce that it was done with the consent of all parties affected, or that there was——

Mr. PLAPINGER. In other words, almost any action that you could take would require conformance to the provisions of the Administrative Procedures Act.

Mr. BOYLE. Oh, yes, I think that is true.

Mr. PLAPINGER. Is this one of the things, for instance, that it would take 90 days to implement the procedures that are being discussed now with the Air Force? There is a 30-day provision in the Administrative Procedures Act. Is this one of the reasons the 90 days is required?

Mr. BOYLE. Not completely, because most of the work we are doing with the Air Force is on a basis of voluntary compliance by the Air Force with procedures which would go far to segregate the traffic from the high density portions of the civil airways system.

Mr. PLAPINGER. And as long as they were the only parties affected you would be able to waive the 30-day provision?

Mr. BOYLE. Oh, yes. And besides it wouldn't be regulatory; in effect it would be voluntary action.

Mr. PYLE. I think we must bear in mind one of the biggest problems we have, one that causes us to use the figure of 90 days, whatever it may be, is the educational problem involved to be sure that all concerned using the airways are fully familiar with what we are talking about, whether it be restricted areas, new airways, or what have you. They have to be printed on maps, distributed for the pilots to use. This poses a very real and lengthy problem.

Mr. BOYLE. Just to finish, I pointed out that we could, under our own authority, exercise the restricted area authority that the Board has given us; take some regulatory action ourselves. Mr. Pyle said there were some areas where we would need additional regulatory action from the Board. One of those obviously is the regulatory action to keep people out of certain areas unless they have a clearance from air traffic control. As I said a while ago, this exists only when we have actual instrument weather conditions prevailing. Under VFR weather, you do not require a clearance.

Consequently, some action in that area would have to be taken to implement further positive control. This type of thing that Mr. Pyle said, on which I'm sure we would have absolute cooperation from the Civil Aeronautics Board. As a matter of fact, they have at the moment outstanding a draft release under which we can do some work in connection with the establishment of the transcontinental airways Mr. Pyle referred to earlier. We do not anticipate any trouble in that area. As a matter of fact, I am sure that the exact contrary exists.

Mr. PLAPINGER. What is the effectiveness of the "golden triangle," if, as a matter of fact, VFR traffic is permitted through the instrument flight plan airways?

Mr. PYLE. I think the answer to that question, which is a very good one, is this: It does provide separation between any two aircraft that are flying on instrument flight rules. However, we must all recognize that those that are not flying on instrument flight rules have the right in good weather conditions to cross or fly along the airways. There is no effective separation from those aircraft other than the "see and be seen" rule. The point the airlines pilots make, and a very valid one, is, "At least it provides protection against ourselves." In other words, two aircraft going in opposite directions or in the same direction are effectively separated by our air traffic controls, but they are not separated as against other traffic that may proceed under VFR——

Mr. MINSHALL. Mr. Pyle, don't you think there should be some kind of an emergency measure to put into effect to have these aircraft, even though they are operating VFR, to give some kind of notification in that area so you can be aware of it and other pilots who are on instrument flight rules?

Mr. PYLE. This is the step, Mr. Minshall, that we are taking in certain airways, those where we feel there is the greatest exposure; and we are taking this first step as an experiment, quite frankly, to find out what our capability is. If we can digest this additional load, we will move on——

Mr. MINSHALL. How soon would you say this could be put into effect?

Mr. PYLE. This is in the area of about 90 to 120 days, somewhere in that area. Again, it is the problem of education, the problem of promulgating the regulation, the problem of being sure all concerned are fully aware of what is going on.

Mr. MINSHALL. Now, in response to my previous question regarding the military, although you, I am sure, would consult with the Defense Establishment before you would make any recommendations to the CAA, do you think on a hypothetical basis something like that should be inquired into very thoroughly until we can adopt more permanent rules in the way of restricting military flights?

Mr. PYLE. By that do you mean putting all military flights on instrument flight rules?

Mr. MINSHALL. I would say all training flights at least.

Mr. PYLE. I think the problem that we must remember is that, just in the Air Training Command alone, there are some 15 or 20 airplanes in the air at any one time for the Air Training Command. Now, this would be physically impossible for us to digest this load. Navy has almost—well, I would say practically 60 percent as many involved; in

other words, almost 5 million hours a year flown in the respective training commands of the Air Force and the Navy alone. Now, to put these into our system, we couldn't possibly handle them. And if we can't handle it, we then in effect ground a greater portion of the training activity of the Military Establishment. This I don't think is the practical solution.

Mr. KILGORE. Mr. Pyle. we very much appreciate your coming up. We will have to cut this off in order to give you an opportunity to go back to the meeting. At an opportunity later on, if it is convenient, we want to have you come back and go over some of these matters in some further detail. Under the circumstances of the urgency of your operations at present, we very much appreciate your taking the time to come up here on this case.

Mr. PYLE. Mr. Chairman and the committee, we appreciate the opportunity to come up here and talk to you; and we are certainly available at the call of yourself or the committee to come up here and do anything we can to be of assistance and to provide you, and through you the public, the information we feel is most necessary to distribute as to what is going on.

Mr. KILGORE. Thank you very much.

The hearing will be adjourned until 1 o'clock tomorrow afternoon in this room.

(Whereupon, at 5:40 p. m., the hearing recessed, to reconvene at 1 p. m., Friday, May 23, 1958.)

FEDERAL ROLE IN AVIATION

(1958)

FRIDAY, MAY 23, 1958

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON LEGAL AND MONETARY AFFAIRS
OF THE COMMITTEE ON GOVERNMENT OPERATIONS,
Washington, D. C.

The subcommittee met, pursuant to recess, at 1:30 p. m., in the caucus room, New House Office Building, Representative Porter Hardy, Jr., presiding.

Present: Representatives Porter Hardy, Jr., Joe M. Kilgore, George Meader, and William E. Minshall.

Also present: Jerome S. Plapinger, counsel; Curtis E. Johnson, staff administrator; and Elizabeth D. Heater, clerk.

Mr. HARDY. Let the subcommittee come to order.

This is a continuation of the hearings started yesterday. Actually, I suppose we might say it is a continuation of a series of hearings begun in June and July of 1956, having to do with an examination of the role of the Federal Government in aviation.

The chairman of the subcommittee is not present, and I will try to pinch-hit for him briefly.

Yesterday's hearings were primarily concerned with the recent crash of a National Guard jet plane with a Capital Airlines Viscount. That was not in itself the entire purpose of this investigation but was a phase of the total subject with which the committee is concerned.

I am sorry we are running somewhat late, but I am glad that now the Chairman of the Civil Aeronautics Board is present. Mr. Durfee, I hope you will come around with any of your staff that you would like to have with you, and other members of the Board.

If you have no objection, the press said they would like to make a few pictures, and I told them the committee would not object if they did it before we got started.

I do want to say the committee is grateful for having you with us at this time. We are sorry that you are under such pressure from the Senate and the House in addition to requirements at the other end of the Avenue. We are grateful to you for being here, and I will ask Mr. Plapinger to proceed.

You did not have a prepared statement, did you, Mr. Durfee?

STATEMENT OF HON. JAMES R. DURFEE, CHAIRMAN, CIVIL AERONAUTICS BOARD; ACCOMPANIED BY LOUIS J. HECTOR AND G. JOSEPH MINETTI, MEMBERS, CIVIL AERONAUTICS BOARD; OSCAR BAKKE, DIRECTOR, BUREAU OF SAFETY; AND ROSS NEWMANN, ASSISTANT GENERAL COUNSEL

Mr. DURFEE. Mr. Chairman, my name is James R. Durfee, Chairman of the Civil Aeronautics Board. I am accompanied by two members of the Board, Mr. Hector and Mr. Minetti, and by appropriate members of our safety staff, headed by Mr. Bakke, sitting at my right, who is our Director of the Bureau of Safety, of the Civil Aeronautics Board.

We were informed that we were scheduled to appear here at 2 o'clock. We got out of the Senate hearing before the Aviation Subcommittee shortly before 1 o'clock and went over to get a little lunch. Mr. Kunzig, my executive secretary, called and said the committee was waiting, so we got over here as fast as we could.

Mr. HARDY. I want you to know the committee appreciates your getting here a little ahead of your previous schedule, but since General Quesada was delayed it is very helpful to us to have you at this time.

Mr. PLAPINGER. Mr. Chairman, is the meeting still scheduled for 4 o'clock today?

Mr. DURFEE. Yes, sir.

Mr. PLAPINGER. In connection with the White House announcement yesterday on control of planes. Can you tell us something about that, Mr. Chairman?

Mr. DURFEE. You are referring to the five-point program which was referred to in the press yesterday as an immediate program as to military jet aircraft and restrictions of flight?

Mr. PLAPINGER. That is right.

Mr. DURFEE. I believe that Mr. Bakke, our Director of Safety, could. I think the committee wants the most competent evidence that we can give you.

Mr. HARDY. That is right.

Mr. DURFEE. I think Mr. Bakke can answer that question better than I can.

Mr. HARDY. As a matter of fact, if you would like to have the other members of the Board join you, we would be delighted to have them do so. The committee would be grateful to get the most direct information that we can. For that reason, we will be glad for such participation by each of you as you may feel will be most helpful.

Mr. BAKKE. I do not have a copy of the five provisions of the President's instruction before me. However, I recall generally the scope of the instructions, and I believe that it would be reasonable to say that, taken in their entirety, they comprise the very large majority of military jet operations today.

The proposal called for a requirement, the practical effect of which, were all five provisions to be put into effect immediately, would be to require that military jet aircraft be operated IFR in controlled airspace, if indeed they were permitted in controlled airspace at all.

Mr. PLAPINGER. Did I understand you to say that these were to be effective immediately?

Mr. BAKKE. No, sir. I said were they to be effective immediately they would have such a practical result.

Mr. PLAPINGER. May I ask you one question at this point, Mr. Bakke. Did you participate in the evolvement of these proposals?

Mr. BAKKE. No, sir, we had no participation whatever.

Mr. PLAPINGER. Do I understand that the CAB was not consulted at all with respect to the publication of these proposals or as far as the preparation of these proposals?

Mr. BAKKE. To my knowledge, there has been no consultation whatever.

Mr. PLAPINGER. Chairman Durfee?

Mr. DURFEE. That is correct. I believe that this proposal emanated as a result of a conference between Chairman Preston, of the subcommittee on appropriations in charge of Commerce and associated agencies. This committee did conduct hearings covering only not only budgetary matters but safety matters. Following those hearings, I believe Mr. Preston and Congressman Clevenger called at the White House, and after the conference with the President—I believe Mr. Quesada was the President's special representative for aviation, Chairman of the Airways Modernization Board. We were not present at that meeting.

Mr. PLAPINGER. You do have the responsibility for the promulgation of air flight controls, do you not?

Mr. BAKKE. Yes, sir; that is right.

I might make one observation with respect to the substance of these recommendations or these instructions. There are two important qualifications. One is that to my knowledge they were directed entirely to military aircraft operated by the Department of Defense. The significance of this is that that order could be put into effect through the executive branch of the Government by direction of the Secretary of Defense as a voluntary restriction upon operation of military aircraft, without the necessity for the promulgation of a civil air regulation compelling compliance with these regulations.

Mr. HARDY. What you are saying is that actually an order to military aircraft can come down from the President himself or from the Secretary of Defense so long as it is more restrictive than existing CAB rules. Is that right?

Mr. BAKKE. Yes, sir; and, of course, so long as the restrictions imposed were not effective upon operations other than those involving public aircraft.

Mr. HARDY. It would not be proper to promulgate rules and issue them to the military that were less restrictive than CAB rules; is that not the fact?

Mr. BAKKE. That is correct.

Mr. PLAPINGER. In your opinion, Mr. Bakke, what is the effect of this order on the capacity of the air traffic control systems that we now have?

Mr. BAKKE. Well, sir, the second observation that I was to make, the second qualification to which I referred, was the qualification that these instructions shall be put into effect as soon as possible. This, of course, leaves a great deal of room for question as to what timing was in effect contemplated. It is true that in small part these instructions

could be put into effect right now within the existing capacity of the system. The question is, of course, how much of the entire package. I do not know that it would be helpful, but the best generalization I can make is that a very small part of this package could be accommodated today. The entire package would have one of two clear effects. If all five restrictions were intended to be imposed immediately, it would clearly saturate the existing system, and the effect of that saturation would be the substantial grounding of military jet aircraft not capable of being absorbed into the system.

Mr. PLAPINGER. How long would you contemplate that it would take?

Mr. BAKKE. If I might just amplify my previous comment, as I indicated there are some of the provisions of the instruction which can be accommodated now.

Mr. PLAPINGER. Which are those, Mr. Bakke? Will you identify them? Will this newspaper clipping help you any?

Mr. BAKKE. I believe I have a copy of it before me now.

Mr. DURFEE. A press release.

Mr. MEADER. Mr. Durfee, does your statement that this is a copy of the press release indicate that there is no order other than the press release?

Mr. DURFEE. I assume that there is an order. I assume when the President issued this order that there is an order in process. We have not had access to a copy.

Mr. HARDY. Could that be a VOCG—verbal order of the commanding general? Do you know whether that actually may be the case?

Mr. DURFEE. I do not know, sir.

Mr. BAKKE. Sir, the only official document that we have seen is an announcement of the five points by the press secretary of the White House, Mr. Hagerty.

Mr. HARDY. And that is the press release which you have before you?

Mr. BAKKE. Yes, sir.

Mr. HARDY. The only official document of which you are aware is the press release of the press secretary, and has no more official connection with the White House or with the administration?

Mr. BAKKE. To my knowledge, there are no other documents in which the substance of these recommendations has been conveyed to the Board.

Mr. PLAPINGER. Chairman Durfee, there is a meeting scheduled for 4 o'clock. What is the purpose of that meeting? Can you tell the subcommittee?

Mr. DURFEE. I believe the agenda of the meeting, of which I have a copy, states two objectives. This is a notice of the meeting of the Air Coordinating Committee, May 23, at 4 p. m.

(1) A meeting responding to the President's request that the Committee meet to discuss ways and means of accelerating further airsafety actions and to eliminate to the maximum degree possible midair collisions. Further, to prepare a report to be submitted to the President outlining these actions.

(2) Principles to guide the Airspace Panel in revising its terms of reference.

Mr. PLAPINGER. Will you familiarize the subcommittee with the present terms of reference of the Airspace Panel?

Mr. DURFEE. I believe, sir, that has specific reference to the implementation of a rule of the Civil Aeronautics Board which has been promulgated, in which the Board asserted its jurisdiction of control over the airspace for both civil and military purposes, subject only to the reservation of power to the President under section 4 of the Air Commerce Act to designate reservations of the airspace for national defense and other national purposes.

The Board promulgated this rule for the purpose of clarifying and asserting its jurisdiction over the airspace for both civil and military use. The effective date of the rule was April 1 of this year. Actually, the notice of rulemaking was issued last fall.

Mr. PLAPINGER. Last summer, was it not?

Mr. DURFEE. July 29, to be specific. Conferences were subsequently held, and on April 1 the rule became effective.

Mr. PLAPINGER. May I ask you a question on this airspace matter? Do I understand you to say that the Civil Aeronautics Board has jurisdiction over the airspace and has issued a rule concerning control of the airspace? I presume you delegated this authority to the Civil Aeronautics Administration. Is that correct?

Mr. DURFEE. That is correct, sir.

Mr. PLAPINGER. What is the function of the Air Coordinating Committee in this matter, if, in fact, the statutory authority rests with the CAB?

Mr. DURFEE. It is the clear intent of the Board, and is so understood by all parties, that this rule is to take any conflict over the jurisdiction over the airspace out of the Air Coordinating Committee. There has been considerable dispute as to the power of the Board, legal power of the Board, to promulgate this rule, and I am happy to say, after considerable conference with the Defense Establishment, with the Administrator, all parties have agreed that the Board has this power. That has been formalized by a letter from Secretary Quarles, recognizing that the Board has the specific power to promulgate this specific rule.

Mr. HARDY. I do not want to interrupt you, Mr. Chairman, but I had thought, from what you said earlier, that the meeting this afternoon was to concern itself with a possible contest of your authority to assert that jurisdiction.

Mr. DURFEE. No, sir. When we delegated this authority to the Administrator, after consultation with the Defense Establishment and the Administrator, in order to implement the authority of the Administrator to designate airspace reservations for both civil and military use, we held conferences as to the most rapid method of implementing that rule. There was available, Mr. Chairman, the technical facilities of the Airspace Panel of the Air Coordinating Committee. We worked out terms of reference which clearly and unmistakably leave the jurisdiction over such designations to the Administrator. However, the instrumentality which is provided to implement this rule, the forum which the Administrator would use in which to conduct hearings under the Administrative Procedure Act or in which to have conferences, informal conferences, to promulgate a rule if he did not choose to have a formal hearing, was the Airspace Panel, which was reconstituted under the name of the Airspace Division. That is an agency of the Air Coordinating Commit-

tee. The Administrator will use that agency and will preside over that agency as a forum, and, after hearings or consultations with that Airspace Division as the implementation of his rule, promulgate the rule.

Mr. HARDY. Now, can we understand that the Air Coordinating Committee, of itself, does not have any authority?

Mr. DURFEE. Well, the implementation, the terms of reference by which we have agreed—may I say we have a working group on which I participate—has agreed on such terms of reference. It requires a revision of the rules of the Air Coordinating Committee, with the present airspace control to be used as a forum by the Administrator.

Mr. HARDY. All right, but let us understand what we are talking about, because you use several terms that do not mean a thing to me, talking about "terms of reference" for this, that, and the other, and the use of the Air Coordinating Committee as a forum. The thing I am trying to understand is whether this authority of the Air Coordinating Committee, whatever it may be, is the result of an agreement which the Board has made and has given to the Air Coordinating Committee. Is that correct, or did they get it somewhere else?

Mr. DURFEE. The only authority that remains in the Air Coordinating Committee is to agree to the reconstitution of the Airspace Panel as an Airspace Division for the purpose of this Board. That is the only action which this meeting contemplates. It will be by a formal vote to either approve or disapprove this change in procedure.

Mr. HARDY. Where does the Air Coordinating Committee get its authority? Where does it get any basis for its vote to have any effect?

Mr. DURFEE. Mr. Chairman, the authority rests in the Administrator.

Mr. HARDY. The Administrator of what; CAA?

Mr. DURFEE. The Administrator of the CAA.

Mr. HARDY. Where did he get his authority?

Mr. DURFEE. He gets his authority (1) from the Congress as to designation of airways; (2) by a delegation of authority from the Civil Aeronautics Board.

Mr. HARDY. The CAB delegated its authority to the Administrator of the CAA; is that correct?

Mr. DURFEE. Yes.

Mr. HARDY. Has the Administrator, in turn, delegated authority to the Air Coordinating Committee?

Mr. DURFEE. I do not think he has delegated any authority, except that he said—

"I will use the Airspace Panel as the forum in which I will conduct hearings, over which I will preside, and at the conclusion of which I will make the decision."

Mr. HARDY. So that, then, the Air Coordinating Committee is nothing more than window dressing to provide an apparent basis under which the Administrator of the CAA will act?

Mr. DURFEE. It provides the forum, and it also provides the technical background and experience that now exists within the Airspace Committee.

Mr. HARDY. But the Air Coordinating Committee has no significance other than that which the Administrator chooses to give it?

Mr. DURFEE. Right. That is exactly correct.

Mr. HARDY. So, if he completely disagrees with it, he is free to throw the whole business out the window?

Mr. DURFEE. If he completely disagreed with it, or if the Air Coordinating Committee chose to disapprove this method of implementation, to which we have agreed and in which the Administrator has full agreement—may I say that it has taken some consultation and deliberation to arrive at this agreement. If they do not choose to approve this method, it will be then incumbent on the Board and the Administrator to promulgate another procedural method to implement the authority.

Mr. HARDY. Why is it necessary that they etiher approve or disapprove, if they have no authority other than that which is delegated from the Board through the Administrator?

Mr. DURFEE. The only authority that I contemplate they will have will be to agree to permit their own Airspace Panel to be used as a forum by the Administrator.

Mr. HARDY. But they have no authority in law; is that right?

Mr. DURFEE. They have no authority in law.

Mr. HARDY. If they disapprove, the Board will voluntarily undertake to find some other procedure?

Mr. DURFEE. That is exactly correct.

Mr. HARDY. What is the purpose of the Board then, to please the Air Coordinating Committee?

Mr. DURFEE. Sir?

Mr. HARDY. I do not understand that kind of a procedure. It is sort of like one of the agencies saying to the Committee, "Come in here and tell us what we ought to do, and then if we do not agree we will send you back and then you do come up with what we want to use in the first place." If the Air Coordinating Committee disagrees so the Board comes back and works on it some more until they finally find something the Air Coordinating Commitee agrees with?

Mr. DURFEE. No, sir.

Mr. HARDY. Is that the way the thing works?

Mr. DURFEE. No, sir.

Mr. HARDY. That is certainly the impression you left me with.

Mr. DURFEE. We believe that we have worked out an agreement with the Defense Establishment and the Administrator to facilitate the assertion by the Board or by the Administrator of this delegated power. We believe that we would not have entered into these negotiations if the Air Coordinating Committee does not agree with this method, in which the Defense representatives and everybody else participates. If they do not formalize this by unanimous agreement, it will then be incumbent upon the Board to proceed under different procedures, which we and the Administrator will establish, completely independent of the Air Coordinating Committee.

Mr. HARDY. I am having a little trouble understanding how the Air Coordinating Committee would formalize anything, because if I understood you correctly their authority stems indirectly from the Board.

Mr. DURFEE. Yes, sir.

Mr. HARDY. Why then would the Air Coordinating Committee formalize any action? Why is it not the Board's action?

Mr. Durfee, let me see if I can bring this to a head. Did you get into a hassle with the President as to what his inherent powers were under the Constitution?

Mr. DURFEE. Never.

Mr. HARDY. I wondered if that was the basis on which this thing was set up.

Mr. DURFEE. No, sir. I will say, sir, there has been some disagreement in the past both as to the legal power and the flexibility of the Board promulgating this rule, asserting this jurisdiction and delegating part of the authority to the Administrator.

Mr. HARDY. Are you not right back to the old separation of powers doctrine, whether the Congress has the authority to give the power to the CAB or whether the Constitution gave the power to the President? Is that where we are now?

Mr. DURFEE. I do not think so, Mr. Chairman.

Mr. HARDY. I hope we are not.

Mr. DURFEE. I do not think we have delegated any of the powers that the Congress has given to us or any of the responsibility.

Mr. HARDY. Has not this delegation of authority to the Air Coordinating Committee grown out of a contention on the part of the Administration—I am not talking about this one particularly, but I am talking about the executive branch of the Government—that you had some of their constitutional authority? Are you not in an argument over this separation of powers?

Mr. DURFEE. No, sir. We have had absolutely no hassle of separation of power, because as I have said we have promulgated a rule asserting our power, and we have a letter from Secretary Quarles which acknowledges, I might say for the first time, unequivocally the authority of the Board to promulgate this rule.

Mr. HARDY. But you are talking about this agreement with the Office of the Secretary of Defense.

Mr. DURFEE. Sir?

Mr. HARDY. I understood you to say you had disagreement with the Office of the Secretary of Defense over this question.

Mr. DURFEE. I would say when we started to discuss the promulgation of this rule we did not have immediate complete agreement.

Mr. HARDY. Do the Secretary of Defense and the White House acknowledge the supremacy of the CAB's authority?

Mr. DURFEE. Subject only to the power of the President under section 4 of the Air Commerce Act. The Secretary of Defense by written communication has acknowledged that authority.

Mr. HARDY. Will you comment on the statute for the Air Commerce Act and what authority it gives the Committee?

Mr. DURFEE. The President under section 4 of the Air Commerce Act is given the right to designate reservations of airspace for both national defense and other national purposes.

Mr. HARDY. Will you get somebody to read it into the record?

Mr. DURFEE. I will read it into the record right now, sir.

Section 4, Air Commerce Act of 1926:

> Airspace reservations. The President is authorized to provide by Executive order for the setting apart and protection of airspace reservations in the United States for national defense or other governmental purposes, and in addition in the District of Columbia for public safety purposes.

Mr. HARDY. What is the definition of the term "airspace reservations"?

Mr. DURFEE. I believe the Board interprets that to mean that the Board has by the same act of the Congress the jurisdiction over the

airspace for both civil and military purposes, subject only to the power of the President to reserve certain portions of the airspace as he deems necessary for national-defense purposes or other national purposes.

Mr. HARDY. So that the Board has authority with respect to all airspace that is not in these specific Presidential reservations; is that correct?

Mr. DURFEE. That is right, sir.

Mr. HARDY. Is there any contest of that in any of the directives of Government agencies?

Mr. DURFEE. Not of which I am aware. I assume that when the Secretary, Mr. Quarles, wrote us that letter acknowledging our power thathe was informed.

Mr. HARDY. Can you tell the committee whether the authority given the President under section 4 has been delegated to the Air Coordinating Committee or to anybody else?

Mr. DURFEE. Not that I know of, no, sir.

Mr. HARDY. Do you know whether or not it is legal to delegate that authority? Can the President legally delegate that authority?

Mr. DURFEE. I believe the President does have the power to delegate that authority legally, as I understand it, to a person whom he has appointed, providing that person to whom he delegates the authority has had his appointment confirmed by the United States Senate.

Mr. MEADER. Has he ever delegated it to the Secretary of Defense or Secretary of the Air Force?

Mr. DURFEE. Not that I know of, no, sir.

Mr. MEADER. Have not, as a matter of fact, reservations of airspace for military use been set up even by subordinate officers?

Mr. DURFEE. That is correct, sir.

Mr. MEADER. Have they done it under the authority of this section 4 of the Air Commerce Act?

Mr. DURFEE. Not under that authority.

Mr. MEADER. Under what authority have they done so then?

Mr. DURFEE. Under the authority which is now given to the Administrator, under which on notice to the Administrator they can for purposes of current military necessity in the national defense give notice that they propose to set aside certain airspace. The Administrator of the CAA can take such action on request of the Defense Establishment or any other interested person.

Mr. MEADER. Does he do that by virtue of this order or rule of the Civil Aeronautics Board of April 1, 1958?

Mr. DURFEE. Does he designate airspace?

Mr. PLAPINGER. Reservations.

Mr. MEADER. Does he designate or permit military reservation of airspace—I am speaking of the Civil Aeronautics Administrator—on the basis of the power which you delegated to him under your rule of April 1, 1958?

Mr. BAKKE. Mr. Chairman, if I might be permitted, the term "airspace reservation" as such is normally associated with airspace which has been designated by the President under section 4 of the Air Commerce Act. Designations by the Administrator are defined in part 60 of the Civil Air Regulations as designations of restricted areas. Designations of airspace reservations under section 4 of the Air Commerce Act have only been made by the President. There have been

many airspace restricted areas designated by the Administrator. When the Administrator designates restricted areas, he does so under the authority given in section 60.13 of part 60 of the Civil Air Regulations, which are promulgated by the Board.

This regulation has been in effect for many years. The Administrator has chosen to execute the authority which 60.13 confers upon him through the machinery of the ACC. By Executive order, the machinery of the ACC, in order to approve a proposed action, required the unanimity of all members of the ACC. Approximately 2 years ago the Board brought to the attention of the Administrator the fact that the unanimity rule of the ACC was not consistent with the requirement of the Administrative Procedure Act for the carrying out of rulemaking duties flowing from the Civil Air Regulations or from title VI of the Civil Aeronautics Act. Accordingly, the Board requested that the Administrator make his decision concerning the designation of restricted areas without the limitation imposed upon him by the unanimity rule in the ACC.

In order to be certain that all concerned were fully aware of the Board policy in this matter, a notice of proposed rulemaking and subsequently an amendment of part 60 was promulgated by the Board, in which this policy was clearly spelled out. The Board stated that action taken under 60.13 was rulemaking, that it flowed from title VI of the Civil Aeronautics Act, was to be accomplished in accordance with the Administrative Procedure Act, and that therefore the Administrator's decision must be made independently of any decision of the ACC or any members of the ACC. The Administrator, however, as contemplated in the Administrative Procedure Act, has discretion to establish for his own convenience that process of coordinating proposed airspace designations which is most suitable under the circumstances. He, with the agreement of the Board, chose to use the machinery of the ACC as a means for collecting information, views, and arguments on the basis of which to make that designation.

The ACC machinery, both the Regional Committee and the Air Space Division in Washington, will only serve as a procedure through which information, views, and arguments are collected by the Administrator, for an independent decision by the Administrator ultimately. The ACC will not under these processes have any authority with respect to the ultimate decision.

Mr. HARDY. That is a very fine statement of the objective of the ACC, but now let us see who are the members of the ACC.

Mr. BAKKE. Under this procedure, all users of the airspace will be entitled to equal representation upon the ACC. The voting in the Airspace Panel or subcommittee disappears as such.

Mr. HARDY. I was just wondering what kind of position the Administrator found himself in with the high-powered group on the Air Coordinating Committee. When the Air Coordinating Committee comes up with some sort of a finding, would not the Administrator be in a rather awkward spot to buck it?

Mr. BAKKE. There will be no finding of the Air Coordinating Committee.

Mr. HARDY. We all were talking about a vote of them a while ago.

Mr. BAKKE. No, sir. The vote——

Mr. HARDY. Then I misunderstood, but I think that is the way I understood the record.

Mr. BAKKE. The vote to which Mr. Durfee referred is a single process which merely establishes the machinery. It is a vote which would be taken this afternoon. Once that machinery is established, there will no longer be any need for any voting process in carrying out these procedures which flow from 60.13.

Mr. HARDY. It is your testimony then that the Administrator acts exclusively on his own and merely listens to all of these discussions for the purpose of his own edification in determining his own course of action?

Mr. BAKKE. That is correct, sir.

Mr. HARDY. I just wonder if that is not a subterfuge rather than a fact. That is the way the thing shows up, but I do doubt that in effect he will really get that in practical operation. I have never seen it work out that way. If the Administrator is so powerful that he can overcome the pressures that he would meet in a group like that, he is awfully good. That does not disparage him at all. I am talking about the functions and the way our Government operates.

Mr. PLAPINGER. He is not a member of the Air Coordinating Committee in his own right; is that not so, Mr. Bakke?

Mr. BAKKE. The Administrator is not a member of the Air Coordinating Committee?

Mr. PLAPINGER. In his own right.

Mr. BAKKE. No, sir, he is not. As a matter of fact, the processes which were explained here never get to the level of the ACC. They only come as far as the Airspace Division. They go no higher.

Mr. MEADER. Why do you not put into the record the names of the members of the Air Coordinating Committee and names of the members of the Airspace Panel, now called the Airspace Division, so we will know who these individuals are?

Mr. BAKKE. So far as any of the components of the ACC, I would have to recite them from memory. I would be very happy to furnish them.

Mr. HARDY. Don't you know the names of the individuals who represent the components on this ACC? Is that not pretty well fixed? They do not fluctuate from meeting to meeting, do they?

Mr. MEADER. The Chairman is General Quesada?

Mr. BAKKE. Yes.

Mr. MEADER. Who are the other members of the ACC?

Mr. BAKKE. Mr. Durfee, the Chairman of the Civil Aeronautics Board. Sharp, of the Air Force. It is at the secretarial level, sir.

Mr. HARDY. If you do not know the names of them, we will ask General Quesada. The thing I am trying to get at is I do not appreciate what real authority the Administrator has if he is dealing with the Air Coordinating Committee, and I know that there is nothing bashful about General Quesada in trying to put across the points he has in mind.

Mr. BAKKE. So far as these airspace considerations are concerned, they will never reach the level of the Air Coordinating Committee. They are dealt with only in subordinate bodies, which are regional committees and the Airspace Division. That is as far as they go.

Mr. MEADER. The only breath of life that a panel has comes from the Air Coordinating Committee, and that in turn gets its breath of life from the Executive order, never having been recognized by the Congress. And they have universally, whether it is by written order or

not, adopted this rule of unanimity, and if there is not unanimity on the panel it is kicked up to the Air Coordinating Committee itself.

Mr. BAKKE. No, sir.

Mr. MEADER. If there is not unanimity there, it is kicked up to the President.

Mr. BAKKE. No, sir; it is not that procedure.

Mr. MEADER. You mean it does not follow in this instance, with the delegation of power that was made on April 1, 1958, but it follows generally with the operation of the Air Coordinating Committee and Panel.

Mr. BAKKE. Correct, sir.

Mr. MEADER. How is this an exception from the usual method of operating the Air Coordinating Committee, and if it is how are you going to keep these people from following the normal pattern of behavior that they have operated under for so many years?

Mr. BAKKE. There are two factors involved here, sir. The first is it represents a recognition that when the Administrator coordinates a recommendation for an airspace restriction in a particular local area he will in any event be dealing with exactly the same people who are now represented on the local airspace subcommittee. Recognizing that, he chose merely to deal with them within the framework of existing machinery. With respect to the procedure, the terms of reference which will be developed from the policy decision reached by the ACC will clearly spell out that the otherwise prevailing procedures of the ACC shall not govern in this instance. It will also make——

Mr. MEADER. You say it will. It has not been done yet?

Mr. BAKKE. It is being done today, sir.

Mr. MEADER. Have you got a copy of it here?

Mr. DURFEE. I do not have a copy with me; no, sir. Maybe I do.

Mr. MINSHALL. I wonder if we could get the names of the ACC in the record now.

Mr. DURFEE. The members of the ACC?

Mr. MEADER. We have Quesada, Durfee, and Sharp so far. Who are the other members?

Mr. DURFEE. I believe the Defense Establishment is represented. The components of the Defense Establishment are represented at a secretarial or assistant secretarial level.

Mr. MEADER. Mr. Durfee, you may remember the report this committee filed with the House on July 27, 1956, on the Federal role in aviation. In that report the committee expressed concern that powers vested by Congress in an independent agency not within the executive branch of the Government, through this mechanism of the ACC created by Executive order, which had not been acknowledged by Congress, and that some of these powers vested in the independent agency intentionally by the Congress were being exercised indirectly through this ACC method. What concerns me in respect of this airspace matter is that it seems to have been the practice here, no matter how much we said it should not be. When you delegate the power of an independent board created by Congress in that form intentionally to an individual within the executive branch of the Government, and he in turn uses a mechanism created by Executive order and subject to their peculiar rules of procedure, in a sense this power vested in an independent board has found itself all of a sudden for practical purposes

within the executive branch of the Government and for practical purposes outside the control of the independent board where Congress put it.

Mr. DURFEE. Congressman Meader, speaking from my own experience—and I have been a member of the Air Coordinating Committee for about 2 years—I have never been asked to participate in any vote, top level ACC, which involved the independent functions of the Civil Aeronautics Board. As I recall, I think the only vote that I ever cast was a vote on a question of the airport situation involving the Navy and the civil airport at San Diego. I participated in that discussion. The action by the Air Coordinating Committee was to refer to that, I believe, as the airport panel. I voted in that vote, but I can say during the 2 years that I have been a member of the Committee the independence of the Civil Aeronautics Board has never been influenced by the Air Coordinating Committee. I would say quite the contrary, sir. The Board has repeatedly asserted its independence, and we have reasserted it in this rule.

Mr. MEADER. I was not interested in casting any reflection upon the independence of the Civil Aeronautics Board. In fact, I congratulate the Board in displaying their independence somewhat more vigorously after our hearings and our report a couple of years ago than they did before that, because I know that a member of the Civil Aeronautics Board sat in the airport panel, and had hearings concerning airports in my own area and participated in the decision, and the testimony before our committee showed that it would be possible that the right of an airline to use a particular airport could come before the Board in a rulemaking proceeding, and notwithstanding that a Board representative had voted and been bound by the Air Coordinating Committee on that very question.

So I am not talking about the attitude of the members or their assertion of their rights and how they demean themselves as individual members. I am speaking now about the possibility that a power vested by Congress intentionally in an independent agency and not within the executive branch of the Government, as a matter of practical operation will have been placed under the control of this executive body which Congress has never recognized.

Can you say that you have taken the same care to see that that will not be so when you have delegated to an individual in the executive branch of the Government, who under the practice in the past had been bound by the decisions of the Air Coordinating Committee and its subordinate panels by unanimous agreement?

Mr. DURFEE. I believe, Congressman Meader, the Board felt justified in delegating to the Administrator the power, since he already has the power from the Congress designating airways, and that involved in the execution of that power he must have coordinating power over airspace. I believe that it is the intention of the Board to delegate that authority to the Administrator completely independent of any restraint from the Air Coordinating Committee.

Mr. MEADER. And in that delegation to the Administrator did he have the authority to redelegate it to another individual or agency such as the airspace panel?

Mr. DURFEE. No, sir; that is emphatically not a fact.

Mr. HARDY. Actually, did he not sort of take that back when the Comptroller General questioned the legality of it?

Mr. DURFEE. The Administrator has never questioned the legality of this acion.

Mr. HARDY. I am talking about whatever delegation has been transferred to the Air Coordinating Committee or its panel. Technically, there is no delegation, if I understand your explanation, but from a practical point of view I am a little doubtful as to whether or not the Air Coordinating Committee does exercise that authority.

Mr. DURFEE. I think perhaps if the committee wants me to read the proposed principles to guide the airspace panel in revising the terms of reference, the specific subject which is to be brought before the Air Coordinating Committee for approval——

Mr. HARDY. I do not understand actually where they get any real authority. It sounds as though they are going to change the terms of reference, and they are changing their authority under which they acted before, and then they have to get the ACC's approval.

Mr. DURFEE. The last paragraph of this provision states:

When there is disagreement at the regional level and agreement is not promptly reached at an Air Space Division, and when the Administrator deems it necessary to have public rulemaking procedures on the matter, each agency represented on the Division will be given 7 working days prior to the notice of the Administrator's intention.

That would include the Air Coordinating Committee as an agency.

Mr. HARDY. Does that not assume, Mr. Durfee, that if there is agreement then it is more or less binding on the Administrator?

Mr. DURFEE. The agreement is not binding on the Administrator.

Mr. HARDY. Well, you kind of say this in reverse. What you have done is to set up terms of reference which will apply in the event there is disagreement somewhere down at a lower level in this thing. You said in the regional level, I believe. And it naturally assumes if there is agreement the thing goes up and becomes binding on the Administrator and is merely ratified by him in a perfunctory sort of way.

Mr. DURFEE. If the agreement is reached, the Administrator will take timely action in accordance with such agreement, without further public hearing.

Mr. HARDY. In accordance with such agreement.

Mr. DURFEE. Except to the extent required under the Administrative Procedure Act.

Mr. HARDY. There is considerable question in my mind as to whether there is not a subterfuge to get around the Administrative Procedure Act, but anyway that is beside the point. I have one other question I wanted to ask. Is anybody on the Air Coordinating Committee to represent the poor unsuspecting public, other than the Civil Aeronautics Board?

Mr. DURFEE. I am glad you put that exception in there.

Mr. HARDY. I did except you on purpose. As a matter of fact, I think you have gone a little far in delegation of your authority, and maybe you had better take a little of it back.

Mr. MEADER. Mr. Durfee, I think you have a list of the Air Space Division now. Would you read their names, so we have them before us here?

Mr. DURFEE. The Air Space Division, the list I have lists for the Air Force Lieutenant Colonel Sommovego.

Mr. MEADER. Which list is this?

Mr. DURFEE. The Air Space Division.

Mr. MEADER. We did not finish the Air Coordinating Committee. Why not finish the Air Coordinating Committee and then give us the complete list of the Air Space Division.

Mr. DURFEE. General Quesada as Chairman; Assistant Secretary Sharp, of the Air Force; Assistant Secretary Short, of the Army, for Air; Mr. Merriam, of the Bureau of the Budget; Assistant Secretary Rothschild, of Commerce; Assistant Secretary Norton, of the Navy; Mr. Jones, of the Office of Defense Mobilization; Mr. Siedle, of the Post Office Department; Mr. Mann, of the State Department.

Mr. HARDY. Who is that at the State Department?

Mr. DURFEE. Mr. Thomas Mann, of the State Department; Assistant Secretary. Mr. Flues, of the Treasury Department; Mr. Lee, of the Federal Communications Commission.

Mr. PLAPINGER. Are these all voting members, Mr. Durfee? It seems to me one time the Bureau of the Budget and ODM were not voting members.

Mr. DURFEE. I believe all but the Budget.

Mr. PLAPINGER. Are voting members?

Mr. DURFEE. Yes, sir.

Mr. HARDY. I want to tell you one thing. If that isn't a high-powered domination by the White House I never saw one. You do not need to comment on that, Mr. Durfee.

Mr. DURFEE. The Air Space Division: Lieutenant Colonel Sommovego for the Air Force; Lieutenant Colonel Turner, of the Army, for Air; Mr. Ainsworth, of the Civil Aeronautics Board; Mr. Pyle, of Commerce; Commander Pine, of the Navy; Mr. Hawthorne, of the Federal Communications Commission.

Mr. MEADER. Is that all?

Mr. DURFEE. That is all.

Mr. MEADER. There is no representation from the Department of Interior on either the Air Coordinating Committee or space panel; is that correct?

Mr. DURFEE. I did not get your question.

Mr. MEADER. There is no representation from the Department of Interior on either of these bodies?

Mr. DURFEE. No, sir.

Mr. MEADER. Yet the Department of the Interior in control of public lands and the promotion of development of oil reserves on the Continental Shelf is very much concerned about having airspace blocked out in such a fashion as to be unable to develop these natural resources under its control; is that not true?

Mr. DURFEE. Congressman Meader, I am not able to comment on the purposes and policies of the President in his selection by Executive order of the Air Coordinating Committee.

Mr. MEADER. Well, the reason I made that point was that I understood you to say a few moments ago that anyone concerned with the use of this space was represented on this Air Space Division so they had a voice in the decisions that were made.

Mr. DURFEE. Not on the Air Space Division. In the hearings which the Administrator will conduct, anyone concerned will have full opportunity to be heard.

Mr. MEADER. Well, even a farmer whose operations might be affected by ACC operation in his neighborhood could appear, I suppose, if he wanted to, at a public hearing, if they set one. But I understood that these elements were represented on the body which had some kind of an influence—and we have not been able to determine exactly what it is—on the decision that will be made on the reservation of airspace. The Interior Department certainly is one agency of the Government that has a great deal at stake.

Mr. DURFEE. Perhaps Mr. Newmann, who is our Assistant Chief Counsel, can speak to such specific matters as you are getting into in the question.

Mr. PLAPINGER. Doesn't the Executive order provide for the participation of additional agencies where their problems are involved? Is that the answer to that question?

Mr. NEWMANN. Yes.

Mr. PLAPINGER. Has that ever happened?

Mr. NEWMANN. I think it has.

Mr. PLAPINGER. I gather it has not happened very often.

Mr. NEWMANN. We will check that and supply the answer.

(The information requested follows:)

Paragraph 1 (c) of Executive Order 10655, under which the Air Coordinating Committee now operates, provides:

"The Committee shall establish procedures to provide for participation, including participation in voting, by a representative of any agency not named in paragraph 1 (a) hereof, in connection with such aviation matters as are of substantial interest to that agency" (par. 1 (a) names the 9 voting and 2 nonvoting member agencies of the Committee).

Substantially the same language has been written into the statement of organization functions and procedures of the Air Coordinating Committee.

The Department of Interior is not named as a member agency of the Air Coordinating Committee but, in accordance with the above provision in the Executive order, it participates as a voting member in the Airspace Panel on aviation matters in which it is interested. The permanent representative of the Department of Interior on the Airspace Panel is Thomas F. Flynn, Jr. His alternate is Earl G. Harrington. We are advised by the ACC secretariat that these representatives receive agenda for all meetings of the panel and they participate whenever they feel that a problem affects their agency.

We also understand that Interior recently participated in the Airspace Panel's consideration of a problem involving a conflict between offshore firing areas and offshore oil wells in the Gulf of Mexico. We understand that the Atomic Energy Commission also participates in the deliberations of the Airspace Panel when they would be affected by matters on the agenda.

In June 1952, nonmember agencies were invited and did participate in the Committee's consideration of Government payment for cost of space used at airports. In this instance, the Department of Agriculture, the Public Health Service, and the Immigration and Naturalization Service and the General Services Administration attended a meeting of the Air Coordinating Committee and voted on the matter which vitally affected them.

Several of the above inspection agencies with responsibility toward the border-crossing aspects of civil aviation participate regularly in the functions of the ACC Facilitation Subcommittee.

The Department of Justice and the Department of Labor have been invited to participate in deliberations of the Committee's Legal Division, and in June 1957 the Department of Labor voted on a matter involving the Warsaw Convention.

The staff secretaries of the various components of ACC see that representives of interested nonmember agencies are advised that a meeting is about to take

place where matters in which they may have an interest are to be discussed and arrange for them to attend and vote on the matter if they desire.

Mr. MEADER. Which other agencies that are not regularly members of the panels are invited to participate in decisions? I am not speaking for the Interior Department, but I happen to recall a number of years ago they were very upset that a big chunk of the Gulf of Mexico was going to be set aside for maneuvers, which would interfere with the development of the oil reserves under their jurisdiction on the Continental Shelf.

Mr. NEWMANN. Congressman, I would like to——

Mr. HARDY. Will you identify yourself?

Mr. DURFEE. This is Mr. Ross Newmann.

Mr. NEWMANN. I would like to address my answer——

Mr. HARDY. General, did you want to get in this?

General QUESADA. I do not want to get into it. I want to offer a little aid on a particular point where I have limited knowledge. Some years ago, there was a question, as you have indicated, of setting aside a part of the Gulf of Mexico as restricted airspace. Interior, and properly so, wished to drill for oil offshore, drilling therein. In order that all the factors might be considered, the Department of Interior came to the Air Coordinating Committee in order that they might consider all of the other extenuating circumstances, and the result was that, though it was restricted area, the rights of the Interior Department to proceed with normal duties and permit this area to be drilled was the result. And then the Department of Interior moved back.

Mr. MEADER. Are you suggesting that the Department of Interior, for that purpose, was made a member of the Airspace Panel or the Air Coordinating Committee and participated in the deliberation and decision, or that they just appeared as a witness?

General QUESADA. They only used the Air Coordinating Committee as a medium of understanding all of the extenuating circumstances in order that their decision might be prudent.

Mr. MEADER. Well, the Interior Department did not have a representative on either the Air Coordinating Committee——

General QUESADA. I think not. They used it to have a place to to find out all the extenuating circumstances.

Mr. MEADER. Do you, offhand, Mr. Quesada, being Chairman of the Air Coordinating Committee, know of any instance where a Government department not normally and regularly a member of either the Air Coordinating Committee or any of its panels had been invited to participate as a member or to send a representative to participate in any decision by either the panel or the Air Coordinating Committee?

General QUESADA. I cannot cite a case, one way or the other, except I think it is reasonable to assume it has been done often. If they were considering a case in which some department of Government had an interest who was not a member, they would call him in to get his views. Likewise, if there was some department of government that was not a member that was considering a problem on which aviation had a bearing, slight though it may be, it would be normal and, it would seem to me, proper to ask the Coordinating Committee for its views.

Mr. MEADER. I am interested in making this point only because,

as Members of Congress, I think we are constantly aware that membership on a committee places one in a very much different position than just appearing as a witness before a committee.

Mr. HARDY. Exactly right, and that is the thing that I think ought to be stressed a little bit. As I understood from the discussion that we have had, the members of the Air Coordinating Committee are chosen because they have an interest in the general subject, and they are on there because they are affected. I believe, Mr. Durfee, you pointed that out yourself.

Now, it was also stated that there was provision for the addition of others to the Air Coordinating Committee, but, so far as we have been able to determine, although there have been other agencies that definitely had an interest, they were not asked to become members of the Committee even for the purpose of considering matters of interest to them. They were invited to testify—which is a lot different from being a part of the panel.

Mr. NEWMANN. Mr. Chairman, if I may, I would like to clarify the record in respect to the Board's responsibilities insofar as this airspace regulation is concerned. In July of 1957, when we issued our notice of proposd rulemaking to deal with this airspace problem, there were several aspects which gave the Board considerable concern. One was in connection with section 60.1 (a), which involved the deviation of the military from the air-traffic rules. Second was in connection with 60.13 (a), as to which, under the old regulation, the Administrator could designate a restricted area but he could not effectively alter, amend, or revoke such a restricted area.

And the third area with which the Board was concerned was with the ACC precedures under which the Administrator was operating.

When we issued the final regulation, which became effective on April 1, 1958, the procedures which had been established required the Administrator to comply fully with the Administrative Procedure Act.

I would like to go into that just briefly. For example, the ACC is utilized as a forum. However, it makes no difference who the members of the ACC are insofar as the Administrator's rulemaking function is concerned because a member of the ACC is no different than a member of the general public or any other interested person.

Now, I would like to develop that just a moment. Under these new regulations, these new procedures, there will be a regional panel or discussion at which all interested parties, whether they are members of the ACC or whether they are not members of the ACC, will be given a full and complete opportunity to be heard. Now, if there is a disagreement between all of these interested parties—and many times there is—the matter will then be taken to the forum of the Airspace Division. Again I say that it makes no difference whether the parties who are participating are members of the ACC or are not, because all parties, all interested parties, are given a full and complete opportunity to be heard at that time.

Mr. HARDY. I do not question that, but I would question whether that is a difference. But, anyway, that is a matter of judgment.

Mr. NEWMANN. Now, under the old procedure, I will concede that a vote was taken within the ACC, and the Administrator would follow the vote that was taken. Under these new procedures there will be

no vote taken within the ACC. The ACC has no more effect on the Administrator's procedures than any other party.

The Administrator will gather this evidence. He will analyze it and appraise it. He will issue notice of rulemaking. And he will follow completely the Administrative Procedure Act.

Mr. HARDY. Well, I do not doubt there is technical compliance.

I do not want to belabor this point much longer. I do not doubt there is technical compliance with the Administrative Procedure Act. But the fact is that the procedure which was followed previously was recognized to be in violation of the Administrative Procedure Act, and all in the world that was done was to make a little change for technical compliance with the statute. Certainly there is no real, practical compliance, because the power of the Air Coordinating Committee still exists.

That there is technical compliance I would not question for a second. But that there is actual and practical compliance I doubt very seriously.

Mr. NEWMANN. Mr. Chairman, there are some very substantial changes that have been and are being made. And I would also like to point out that the Board has very carefully placed a safeguard in these procedures by providing that the Board upon its own initiative may review the action of the Administrator at any time it may see fit.

Mr. HARDY. Does it ever do it?

Mr. NEWMANN. We have never had the opportunity, because the rules are just becoming effective. We are now implementing this regulation.

Mr. HARDY. Well, just one other observation and then I am going to see if Mr. Plapinger or members of the committee have anything further.

Under this system that is set up, first of all, it is very clear that there can be complete domination by the White House. And I am not attributing any ulterior or improper motive, but I am talking about the practical effect it can have.

Secondly, certainly within the Air Space Division, there is complete domination by the military. And the Lord knows I am for defense, but I am not at all sure that I want to see the military running all of the airspace over this Nation. Neither am I sure that I want to see them take over all of Government—as the President's original reorganization plan would have made possible.

Goodness knows, the world is faced with enough of that situation right now when we consider what is happening in France.

So I am not in favor of complete domination by the military—which I do not expect anybody else here to admit but it is clear as crystal as far as my judgment goes, which may not be very good, but it is one layman's viewpoint. It is not a healthy situation from my point of view.

Mr. Plapinger, do you have anything further?

Mr. PLAPINGER. No, sir.

Mr. HARDY. Mr. Kilgore?

Mr. KILGORE. Mr. Durfee, I would like to raise a question with you with respect to whether or not the CAB has and now exercises authority over the firing of guided missiles in the United States, which

missiles may cross designated airways. I think there are instances in which missiles are fired from Holloman into areas in the northwest, the flight path of which missiles may cross designated airways, and instances in which missiles may be fired from an island off the coast of Lower California. The Navy fires, I believe, missiles from there into northern Utah. And in that instance I think there would be a crossing of designated airways.

What I am curious about is whether or not the CAB exercises any control over those firings for the protection of traffic on designated Federal airways.

Mr. DURFEE. As of today I do not believe the Board has ever asserted jurisdiction over the air space insofar as it involves firing of guided missiles. I believe the Board has that subject under investigation at the present time.

Mr. KILGORE. You say, then, that at this time the Board has not asserted any authority over that operation but the matter is currently under consideration by the Board?

Mr. DURFEE. Yes.

Mr. KILGORE. Could you tell the committee when the matter came under active consideration by the Board—when the matter of whether or not the Board would assert its authority came under active consideration by the Board?

Mr. BAKKE. Sir, I do not recall the date on which it was formally set up as an active project within the Board. It was approximately 6 months ago.

Mr. KILGORE. Is the information available to the Board whether or not such missile firings or whether the flight path of such missiles may be at altitudes which will be from time to time occupied by commercial aircraft?

Mr. BAKKE. It is my judgment, sir, that there are no altitudes through which the missiles will be passing which are occupied by civil aircraft. However, I must say that I have no knowledge of any specific instance. I think that would be a better answer to the question. I have no knowledge of any specific instance where such missiles would pass through an altitude normally used by civil aircraft.

Mr. KILGORE. Could you tell the committee whether or not you know if there is any assertion on the part of the Department of Defense or of anybody else that the Civil Aeronautics Board does not have authority over the controlling of flights of such missiles when they may cross Federal airways?

Mr. BAKKE. I have no knowledge that there is such an assertion, sir. There is only one parallel case, at least which has a similarity. The question here, of course, is whether the missile may be truly meeting the definition of "aircraft" as it appears in the act. The Board has asserted authority with respect to a somewhat similar case.

Part 48 of the Civil Air Regulations deals with the control of moored balloons, for instance. A similar dispute at one time arose concerning these. The Board has asserted authority there and applied certain regulations.

Whether a similar assertion of authority should be made in this case is the objective of the project which we now have under consideration.

Mr. KILGORE. Well, not attempting to prejudge that question, I take it from your statement that if it is the opinion of the Board that such a missile is an aircraft, then the authority exists by statute in the Board?

Mr. BAKKE. That is correct, sir.

Mr. KILGORE. Moving one step further, since there has been no assertion of authority up to this point by the Board, can you tell the committee whether there has been any—and, if there has been any, what—coordination between the military agencies who are carrying on this activity and the Civil Aeronautics Board with respect to the flight paths of these missiles?

In other words, has the Board been advised of any activity or any action on the part of the military for the protection of the airways? Or has the Civil Aeronautics Board requested of the military any information with respect to their operations?

Mr. BAKKE. Sir, with respect to the two instances that you relate, with respect to one of the two instances you relate—the firing I believe it is at Point Magu restricted area—with respect to that one, yes, there has been a considerable coordination between the Board and the military. With respect to the other one I am not familiar with the details. I can only answer in the negative. No conflict has been brought to my attention.

The manner through which we become acquainted, however, is by Board participation in ACC discussion, where the military bring out, for instance, proposed plans of this sort.

The Point Magu case, for instance, was one such case under the old procedures in the Airspace Panel.

Mr. KILGORE. The action you referred to then was the action which was the discussion in the Air Space Panel?

Mr. BAKKE. That is correct, sir. That is a process through which we remain advised as to military plans of this sort.

With respect to one of them, I know we do have knowledge with respect to the second I am not certain.

Mr. PLAPINGER. Would you know, Mr. Bakke, whether the CAA is advised of the times of firing?

Mr. BAKKE. I have no knowledge of that, sir.

Mr. PLAPINGER. Is this something the Board would be interested in?

Mr. BAKKE. Sir, if there were any conflict between the operation of these missiles and air commerce, clearly we would be interested.

Mr. PLAPINGER. For instance, take the firings at Cape Canaveral. I assume at that point off the coast of Florida there is an airway leading down to Miami. Now would you know whether the CAA is advised in advance by the military when the firings take place?

Mr. BAKKE. No, sir. I have no direct knowledge. Recently, within the last 2 or 3 weeks—again the particular date escapes me—complaint was brought to the attention of the Board concerning one such firing, the possibility of conflict between certain stages, for instance, of missiles as they are dropped en route, and falling through airspace which might conflict with aircraft on airways outside the continental limits of the United States. We have requested our people to investigate this matter. I have not heard a report on it yet.

I cannot answer your question directly. There is such a complaint; it is under investigation.

Mr. MINSHALL. Mr. Chairman——

Mr. KILGORE. Mr. Minshall.

Mr. MINSHALL. Moving back to the first part of the testimony this afternoon, we had some discussion about the 5 points that the President handed down, and I believe Mr. Durfee and Mr. Bakke both said that you had no formal notification of those 5 points until you either heard of or received a press release. At what time did you get that information?

Mr. BAKKE. Sir, I believe it was on the wires at around 5 o'clock yesterday evening.

Mr. MINSHALL. Have they indicated to you—or have you made any inquiry—that they are going to send you formal notification of these instructions?

Mr. BAKKE. Several attempts to obtain information were made by the Chairman last night. I do not know the result.

The answer is "No," sir. There was no indication given. There has been no indication received from the White House that we may expect formal confirmation of this.

Mr. MINSHALL. You have made a careful evaluation and study of these 5 recommendations, have you not, Mr. Bakke?

Mr. BAKKE. Sir, I would be somewhat reluctant to call it a careful study. As a matter of fact, I have had but one opportunity to read it in the last 24 hours, and I merely had some preliminary reactions which I described earlier to the committee.

Mr. MINSHALL. Your preliminary reactions, if I understood them correctly, were that of these 5 points very few of them or a very small percentage you will be able to put into practical operation. Is that correct?

Mr. BAKKE. Yes, sir. If you speak of the Air Force operation as a whole within the continental limits of the United States, my reaction is that immediate implementation of these would be in rather small part.

Mr. MINSHALL. What percentage would that be?

Mr. BAKKE. Sir, it would be impossible to say. I believe that at the time that our discussion was terminated on this point I started to make an observation that there are some parts of the country in which the total percentage of the airspace which has been designated as airways is somewhat small. Broadly speaking, perhaps in the Southwest. There may be certain areas here in which it would be possible for particular bases to relocate existing training areas, and otherwise, so as to dispose their activities to keep them off the airways—that is, to create less conflict with airways traffic. Here in the East, however, very little, if any, of this could be done.

Mr. MINSHALL. You do not think much of that could be done in the golden triangle area?

Mr. BAKKE. I thing very litle of it can be done in the golden triangle area, sir.

Mr. MINSHALL. In other words, it is your considered opinion that the recommendations of the President as made would have little or no effect upon the existing danger that exists of midair collision as far as the military are concerned in the golden triangle area?

Mr. BAKKE. Well, sir, I would not have described it in that language.

Mr. MINSHALL. How would you describe it then? Use your own words.

Mr. BAKKE. I would say, sir, that every contribution that can be made in this direction is without any question helpful. My view is, however, that the total amount of help through these procedures right now will be small.

Mr. MINSHALL. How do you think we can right now control the military and reduce some of these midair collisions?

Mr. BAKKE. Well, sir, I might relate rather briefly 2—as a matter of fact, 3—separate studies which we have made which indicate to us where the principal conflict arises from military operations.

First of all, we have this near-miss study. We have been receiving near-miss reports for 2 years now from the military and civilian pilots alike. We know there is a distinct trend within the near-miss report for an increase in near misses at high altitudes as related to other operations. Near misses in jet operations at high altitude are on the increase.

Secondly, we have made an evaluation of actual collisions in the last 10 years and compared these—this was to have been my third point—with the collision experience of the military. We find that collisions at low altitudes in civil operations are relatively stable or, if anything, in the last 10 years, there has been a decline in the number of midair collisions.

However, the number of midair collisions at high altitudes in jet aircraft is on the increase.

These two facts led us to the conclusion that we were faced with a fairly stable condition in the lower altitudes, that these would be improved in due course by the improvement in the air traffic control system.

It was very clear, however, that with the increase in the hazard in high-altitude operations and, more particularly, because of the imminent introduction of jet transport aircraft at high altitude, we could not delay any longer the development of a positive control system at high altitudes. This is the action which should be treated of immediately in the Board's judgment.

We put out a notice of proposed rulemaking to this effect. Within the month, on the basis of what comment we have already received, it is anticipated that this regulation will be effected and that the Administrator can focus as much of the capacity of his air traffic control system as he will, bringing under positive control high-altitude jet aircraft.

This is where we believe by far the principal emphasis is required right now.

Mr. MINSHALL. But is it not a fact that most of these near misses or at least the actual midair collisions have occurred at lower altitudes, with the exception of the Nevada one? The last one is one that happened at an altitude of about 8,000 feet.

Mr. BAKKE. Sir, I could relate, if the committee would like, the number of midair collisions in civil aviation since 1946, and I think it would show that, although there is some irregularity in the number, there is actually a decline in midair collisions at low altitudes.

Mr. KILGORE. Could you supply that to us?

Mr. MINSHALL. Will you put that in the record? Have you got it there so that you can read it off without taking too much time?

Mr. BAKKE. Yes.

Mr. MINSHALL. How long is it? Would it be better to submit it, or can you briefly give it to us orally?

Mr. BAKKE. I can find it rather quickly, I believe, sir.

Mr. KILGORE. I believe it probably would serve our purpose better, if it is satisfactory to you, to put your entire study in so we might include it in the appendix, if there is no objection on your part.

Mr. BAKKE. Not in the least, sir.

(See appendix exhibit 1, p. 409.)

Mr. MINSHALL. Mr. Bakke, as the head safety man for the CAB, their adviser, you have admitted here today that because of the lack of proper equipment that we cannot possibly put our entire military and commercial aviation under positive control for some years to come. Is that a correct statement?

Mr. BAKKE. Yes, sir.

Mr. MINSHALL. Then as a stopgap measure or an emergency measure, in an effort to reduce the cause of some of these accidents and near misses that are going on daily, what can we do, starting say next week?

Mr. BAKKE. Sir, I think that the recommendations which the President has proposed include measures that can be undertaken right now.

Mr. MINSHALL. Yes, but you said very little of those, a moment ago, could be actually put into operation. Now, what is the truth of it—whether they can or whether they cannot be?

Mr. BAKKE. Mr. Chairman, I wonder if I might read this list? The five items which are contained in this are, first, to include jet trainer aircraft flown by student——

Mr. MINSHALL. I have read those, and you have read those, but you made a statement a moment ago that very few of the President's recommendations could be put in on an emergency basis—in other words, to take effect, for example, next week. Now, you said some of the President's recommendations could be very helpful. Which ones can and which ones cannot? If so, what percentage are they of the whole?

Mr. BAKKE. Sir, I could not possibly give you any precise percentage. What I have tried to say is——

Mr. MINSHALL. You gave me an implied percentage when you said "very little." "Little," to me, would mean something like 10 percent. Would that be about right?

Mr. BAKKE. Well, sir, just as an example, we have one that indicates that——

Mr. MINSHALL. Well, is that right or not?

Mr. BAKKE. Yes, sir; it is. I said it is.

Mr. MINSHALL. In other words, less than 10 percent of the President's recommendations could be put into effect next week?

Mr. BAKKE. I am unable to give any validity, sir, to the 10-percent value, as I indicated earlier.

Mr. MINSHALL. You used the word "little."

Mr. BAKKE. Yes, sir.

Mr. MINSHALL. Little as contrasted to a lot. What is your own definition of those two terms?

Mr. BAKKE. I would be extremely hard put, sir, to associate any quantitative value with it.

Mr. MINSHALL. In other words, you would rather not carry it on any further and would be glad to read into the record some prepared statement later on, would you?

Mr. BAKKE. If your question asks——

Mr. MINSHALL. I am not trying to confuse you. All we want up here are the facts. What are the facts——

Mr. BAKKE. Sir——

Mr. MINSHALL. Whether or not we can do something about the President's recommendations or, as you said, we cannot? I want to know just what the truth of the matter is, and I think this committee is entitled to know.

Mr. BAKKE. Sir, I saw these yesterday. I have read them once for the first time. I told——

Mr. MINSHALL. And I have read them once.

Mr. BAKKE. I told the committee I have an initial reaction to these. It is this: Eventually the entire program can be put into effect. I said it would be some years before this could be done. Right now, in the immediate future, it was my judgment that only a little of it could be done. I do not know whether I could associate 10 or 15 percent of it, sir. All I mean is that it is less than the majority. I mean little.

Mr. MINSHALL. Little would not have much effect on the whole picture.

Mr. BAKKE. No, sir. And immediately upon receiving exactly that question, sir, I said that any contribution that would come from this I would consider a substantial contribution in the sense that if it would save lives it is desirable and it should be begun right now.

I say that this program is one which can be begun right now. My testimony is that it would be overly optimistic to expect startling results, large results, from this tomorrow. That is my testimony. I think that—although we can start this now—that it is only reasonable for us to expect that it will be some time before we see substantial results out of it.

That is what I meant when I said that it will have little effect right now.

Mr. MEADER. Mr. Bakke, do you have some other suggestions as to what can be done immediately? Can anything more be done immediately than the President has recommended in those five points?

Mr. BAKKE. Sir, ever since the proposal for the positive control route was circulated by the Board, a group of the staff of the CAA and the Board met together to determine how most efficiently we might plan for the implementation of the positive control route. Obviously, the facilities of the Administrator—that is, the air traffic control facilities—will have to be brought into play.

As this group got together to consider what action should be taken, consideration was also given to the question, What other related activities can be undertaken right now to minimize the conflict in airspace requirements between the military and civil?

There were several things which were agreed should be instituted. I can enumerate a few of them, for instance, as a matter of illustration. However, Mr. Pyle, in his testimony before you yesterday, described all of them.

These were such things as a team of men going out to military bases, reviewing existing jet penetration procedures and instrument

approach procedures with a view toward relocation of navigation aids so as to get test procedures off airways—perhaps even a realinement of airways so as to avoid military bases entirely. This kind of reexamination of existing facilities and procedures should be instituted; and, as a matter of fact, it is underway right now.

We have had several discussions with the Administrator in which we have pointed out that under this 60.13 authority for the establishment of airspace restrictions which we described earlier we saw in it adequate authority to begin the establishment of "scramble corridors"—that is, bits of restricted airspace through which the very high performance interceptor-type aircraft could climb in their interceptor missions without conflicting with other airspace. That should be begun immediately. It should be accelerated.

Mr. MEADER. Mr. Bakke, you say all of these were mentioned by Mr. Pyle yesterday?

Mr. BAKKE. I believe, if I recall his testimony, most of them were. Some of these are regulatory matters which, in order to come to fulfillment, require final action by the Board. Others are administrative matters which are being handled by him.

Mr. MEADER. I did not mean to ask for repetition.

Mr. PLAPINGER. Mr. Bakke, has the Las Vegas crash investigation been completed yet?

Mr. BAKKE. No, sir; it has not.

Mr. PLAPINGER. Will you submit for our files a status report on your investigation of the crash in Maryland and the Las Vegas crash?

Mr. BAKKE. I would be very happy to, sir.

Mr. PLAPINGER. May I ask one further question concerning the assertion of jurisdiction on missiles. When is it expected that decision will be reached on this matter?

Mr. BAKKE. I am sorry; I do not recall the date by which the project is scheduled to be closed.

Mr. PLAPINGER. Can you supply that for the record, please?

Mr. BAKKE. Yes; I would be happy to, sir.

(The information requested follows:)

The Bureau of Safety has developed a proposal to amend part 48 of the Civil Air Regulations to restrict the firing of rockets and missiles into the navigable airspace by persons or organizations other than the military services.

In accordance with the terms of the Administrative Procedure Act, these proposed amendments are now being prepared for circulation to the general public in the form of a notice of proposed rulemaking. It is expected that the notice of proposed rulemaking will be circulated to the industry by June 20, 1958, with an end date for comment some 30 days later.

Subsequent to the closing date for comment, the Board's Bureau of Safety will analyze all comment and a final proposed amendment will be submitted to the Board for adoption on or about August 15, 1958.

Mr. DURFEE. Mr. Chairman, for the record, I would like to say that I testified this morning before the Senate committee that the action taken by the President after his conference with Congressman Preston and Congressman Clevenger is a very substantial step toward the solution of some of these difficulties.

Now, I think this press release said 5:05. But we had an oral argument all day yesterday, and we had a Board meeting last night, and I have been before the committee ever since 10 o'clock. I am certainly incapable of an accurate evaluation as to just what can be done myself.

But I do think, and I so testified, and I want to reiterate, that the President did in response to the request of the chairman take whatever steps he was capable of doing, which were prompt and immediate action in this regard.

Mr. HARDY. Can I comment on that, Mr. Chairman? I think that is a very fine observation and commendation of the action which the President has taken. Of course, I feel a little bit of concern that it apparently was taken without the advice of the people in Government who are charged with the major responsibility in that field, and so it disturbed me a little bit to recall your initial testimony before this committee this afternoon to the effect that the first knowledge you had of it was when you saw the press release.

Of course, we know that the President cannot be expert on every subject before him and he had to get this from somewhere. Maybe General Quesada can enlighten us on where it came from.

Mr. DURFEE. I do not know whether the President knew it or not, but actually we were engaged yesterday until after 5 o'clock in oral argument in an original case in which there were over 40 attorneys.

Mr. HARDY. You do not know then, Mr. Durfee, whether he may even have tried to get you to help him?

Mr. DURFEE. We would have had to dismiss about 40 lawyers from 5 different States in the South if we went over to the White House.

Mr. KILGORE. Thank you, Mr. Durfee and Mr. Bakke and the others who have accompanied you. We very much appreciate talking with you. If convenient, we will be in touch with you sometime next week when things become a little easier perhaps and carry this discussion somewhat further.

Thank you very much.

The committee will be in recess for about 1 minute.

(Whereupon, a short recess was taken.)

Mr. KILGORE. We will resume. The next witness is General Quesada.

I wonder if at the outset you have any comment you would like to make to us with respect to some of the testimony and committee comment you have heard this afternoon. If there is anything in particular you think of you would like to enlighten us on, we would be pleased to have that at this time.

STATEMENT OF HON. ELWOOD QUESADA, CHAIRMAN, AIRWAYS MODERNIZATION BOARD, AND SPECIAL ASSISTANT TO THE PRESIDENT FOR AVIATION FACILITIES PLANNING

General QUESADA. Well, of course, I consider myself here as Chairman of the Airways Modernization Board.

Mr. PLAPINGER. Excuse me, General. The invitation was given to you at the White House. and I did not know which of the three hats you would be wearing today.

General QUESADA. I am here as Chairman of the Airways Modernization Board.

Mr. HARDY. General, would you mind advising the committee what its authority is, where it got it, and whether or not it has jurisdiction over the airways?

General QUESADA. I did not quite hear the question.

Mr. HARDY. Well, what I was concerned about at the moment was this: You say you are here as Chairman of the Airways Modernization Board, and I was trying to understand specifically what is the statutory authority of the Airways Modernization Board, or what authority does it have, and where did it get it.

General QUESADA. The authority of the Airways Modernization Board is clearly outlined in Public Law 85–133 that was passed by the Congress of the United States.

Mr. HARDY. Well, let's think in terms now of the matter that the committee is concerned with. And we are primarily concerned at the moment with control over airspace or the reservation of airspace. Does the Airways Modernization Board have specific authority in that field?

General QUESADA. It does not.

Mr. HARDY. Well, then, maybe we had better talk about the Air Coordinating Committee and stay away from the Airways Modernization Board for the purposes that we are concerned with right at the moment.

Mr. KILGORE. General, you were about to make a comment to the committee.

General QUESADA. In response to your question, I was about to say that there is one point that seems to be missed in terms of the meeting this afternoon that the Air Coordinating Committee is having. The objective of this meeting is, among others, to meet and collectively discuss and objectively endeavor to find ways and means through which we can take early action to relieve the congestion on the airways and reduce the exposure to hazards.

In this particular case, what we have in mind is through the processes of logical persuasion to ask the military services and others to relinquish some of the rights that they now have, and as enjoyed by all of the users of the airspace, that do not require either any action by the Board or anybody else.

Mr. KILGORE. So that the purpose of your meeting is that of agreeing upon anything which any user of the airspace may voluntarily do in order to reduce congestion?

General QUESADA. Not quite. The users of the airspace are general aviation, the air transport companies, and the military services. That is a logical breakdown.

Mr. KILGORE. Right.

General QUESADA. One of the purposes is through persuasion to ask the military service to give up, and do so voluntarily, some of the prerogatives that they now have and the other two users will continue to retain. To accomplish those objectives by going through a rule-making procedure might take I do not know how long.

Mr. KILGORE. Specifically, what of the prerogatives which they are currently exercising do you have in mind requesting the military to relinquish?

General QUESADA. As a single example, let's take the training command. Now, when I say "training" in this case I mean that portion of the activities of the service in which they are teaching a boy to fly. That expression is often loosely used and often misunderstood. Training as I am using it now is that function that the services properly engage in to teach a boy to fly an airplane.

Mr. KILGORE. And you are referring to that type of training as training prior to the time he becomes an educated pilot as distinguished from proficiency flying he may do after that time?

General QUESADA. That is right.

Now, in the course of that training, it is logical that the boy should have to fly from time to time on the airways. In those flights in which he has to fly on the airways, and should be taught to fly on the airways, he has the prerogative of flying VFR, visual flight rules, or IFR instrument flight rules. If the weather is below certain limits and under certain conditions he must fly IFR. Under other weather conditions of visibility and cloud cover, he can fly VFR. So can the airlines and so can the general aviation pilot.

Now, the suggestion that I am making today, is that under those circumstances we are urging that the student pilot file an IFR flight plan on airways and be deprived of the privilege of flying a VFR flight plan on airways which everybody else has.

Mr. KILGORE. Now, one of the points released by the President yesterday related very much to this sort of thing, did it not?

General QUESADA. Yes, and I am giving you an example of what it means.

It was not released by the President. By Mr. Preston.

Mr. KILGORE. By whom?

General QUESADA. Mr. Preston.

Mr. KILGORE. By Congressman Preston? Then are you talking about an implementation of one of the points as released yesterday, an implementation by way of a request through the Air Coordinating Committee that the military relinquish the authority it has to now carry on training on the airways under visual flight rules when visual conditions pertain?

General QUESADA. It is my intention to persuade them to yield this right.

Mr. MEADER. Will you yield a moment?

Mr. KILGORE. Yes.

Mr. MEADER. General Quesada, if the President orders it, cannot the military obey that order without intervention of the Air Coordinating Committee?

General QUESADA. Oh, I think they could.

Mr. MEADER. Just what function does the Air Coordinating Committee contribute then by holding a meeting to carry out the President's order? Is that not just one more unnecessary step?

General Quesada. No, I do not think it is an unnecessary step. I think the Air Coordinating Committee is serving the very function for which it was formed—to bring coordination within the various departments of the executive branch of Government.

Mr. MEADER. If it is a question of something that can be performed only by the Defense Department or Air Force specifically in its own operations, why should there be any need of coordinating anything?

General QUESADA. Because it involves several branches of Government—the Army, Navy, Air Force, CAA.

Mr. MEADER. Well, I understood—maybe I misunderstood—that this action that was recommended by the President did not require any action by the Civil Aeronautics Board, or the Civil Aeronautics Administrator or anybody else, that it was something that could be

carried out by orders of the military authorities, and that when they received instructions from the Commander in Chief that that was all that was necessary.

General QUESADA. The President could issue an order as Commander in Chief, but I do not think that he conducts himself in that manner. I do not think he is dogmatic. I do not know of any case where he has been. This is a case that requires a great deal of knowledge and expert understanding, and I think he relies on the services to contribute their utmost to assist him in what his main endeavor is.

Mr. MEADER. Maybe I am belaboring a point, General, but I have somewhat less than admiration for committee action where it is not necessary to have a group of men get together with all the delay attendant upon assembling them and discussion and finally bringing out some program. Where a matter can be carried out by direct order, as would seem to me to be possible in this case, it seems to me we might get speedier action, perhaps more effective action, than to have it submitted first to a committee and waiting until the committee has taken action, particularly if power already exists to take direct action.

I have not heard anything yet to indicate there is any lack of authority to implement that recommendation.

General QUESADA. I have no response to that.

Mr. HARDY. Has it been discussed with the Joint Chiefs of Staff since it relates only to the military?

General QUESADA. It does not relate only to the military.

Mr. HARDY. Well, I understood the only people you intend to affect by the illustration you gave at least were the military. And you did point out, of course, CAA is interested in that because they have some responsibility.

General QUESADA. It affects the CAA.

Mr. HARDY. Yes, but it is a tightening up of the rules insofar as the CAA is concerned.

You heard, I suppose, Mr. Durfee's testimony about that here a little earlier. And this certainly would be, as he puts it, a voluntary limitation going beyond the requirements of the CAA.

General QUESADA. It is a voluntary limitation that we hope they will take, and I would not be surprised if they volunteered limitations other than those we are suggesting.

Mr. HARDY. So that the CAA would not have to alter its rules at all?

General QUESADA. It would not. It would affect them in terms of the volume of traffic, however.

Mr. HARDY. Well, that is a mater that I presume they would not be very likely to object to, would they?

General QUESADA. If it is overburdening, I think they would object strenuously.

Mr. HARDY. You mean the volume of traffic under instrument control?

General QUESADA. Yes.

Mr. HARDY. I do not know whether they have got facilities to do that. That might be a question.

Mr. KILGORE. From looking over the list, and I am merely looking at the press report—when I say "merely" I do not mean to depreciate it; I assume it is accurate—each of the five points under discussion

resulting from the conference would relate or does relate specifically to military jet operations. Would it be the procedure for each of these five proposals that the Air Coordinating Committee suggest to the military that the military relinquish——

General QUESADA. Please let me make this five-point thing clear.

Mr. KILGORE. All right.

General QUESADA. There are no five points in the President's direction to me to hold this meeting of the Air Coordinating Committee. There is no limit to the number of areas that we will search in order to bring relief.

Mr. KILGORE. These five points are merely somebody's estimate of five things which could be done under that authority?

General QUESADA. That is right. Mr. Preston happened to say at the press conference that he had five items, and he inadvertently referred to them as points, and they were then picked up in the press as "five points."

(The following article is from Washington Post and Times Herald of May 23, 1958:)

[Washington Post, May 23, 1958]

IKE ORDERS SPEEDUP IN AIR SAFETY

CIVILIAN, MILITARY AUTHORITIES TOLD TO GET TOGETHER

By Carroll Kilpatrick, Staff Reporter

President Eisenhower yesterday instructed Federal aviation agencies to inaugurate an immediate emergency program designed to avert air collisions such as the one which claimed 12 lives Tuesday near Brunswick, Md.

In the face of mounting congressional demands for remedial action and growing criticism of divided Federal authorities over air traffic the President told Lt. Gen. Elwood R. (Pete) Quesada (retired) to direct the several Federal civilian agencies and the military to get together at once on new safety measures.

Quesada is the special aviation assistant to the President and chairman of the Airways Modernization Board. Several hours before he gave Quesada the emergency powers, the President ordered a study "to further accelerate air safety actions and to eliminate to the maximum degree possible midair collisions."

Congressional experts on air safety problems promptly called the study approached no solution.

Mr. Eisenhower gave his instructions to Quesada at a lengthy afternoon conference with Representatives Prince H. Preston, Democrat, of Georgia, and Cliff Clevenger, Republican, of Ohio, senior members of a House Appropriations Subcommittee. The two Congressmen had urged emergency action after Tuesday's crash, the second in a month involving a military jet and a commercial airliner.

After the meeting, Quesada explained that Federal authorities within the next few days would implement a five-point program which would impose new restrictions on the military. It would require that:

1. When jet training aircraft are piloted by military student pilots on civilian airways, they will operate on instrument flight rules and thus be under Civilian Aeronautics Administration control.

2. All military jet training "penetrations" from high to low altitudes will be safely away from civilian airways.

3. Military jets, whether on training or other missions, will be required to file flight plans with the CAA when they are "itinerant" or, in other words, on unscheduled crosscountry hops.

4. Pilots making "proficiency flights" to keep up their skill in handling military jet planes must use routes off the civilian airways.

5. When operational flights in military jets are made on the civilian airways, they must be under CAA control and on instrument flight rule conditions. Moreover, when crossing civilian airways, the jet pilot must go on instrument control if his plane is at an altitude of less than 25,000 feet.

PROMPT ACTION SEEN

Preston said his meeting with the President was "very satisfactory" and that Mr. Eisenhower showed great interest in the safety problem.

Quesada said a start could be made to putting the new regulations into effect within a few days but that technical problems would prevent them all from being completely carried out for some time.

The Air Force has resisted putting stiff controls on military flights. Federal civilian agencies have not controlled military flights. As long as they could "see and be seen" military pilots have been free to move with only rudimentary restrictions from airport to airport.

CAA takes over only when pilots volunteer to be supervised or when visibility is below specified safe minimums.

OLD PRACTICE OUTMODED

CAA Administrator James T. Pyle told the Senate Aviation Subcommittee of the Interstate and Foreign Commerce Committee that the "see and be seen concept is outmoded" because of the high speed of the jets.

Pyle testified before the President issued instructions to Quesada. The CAA chief said a new system of air control for all commercial airliners in cross-country flight was being prepared and that they would fly on protected "boulevards."

He said it would be desirable to establish such boulevards for other flights but that this would be impossible at present because of the shortage of equipment and personnel.

MONRONEY PRESSES FOR BILL

Subcommittee Chairman A. S. Mike Monroney (Democrat, Oklahoma), author of a bill to place control of airspace and all military and civilian air traffic under an independent Federal Aviation Agency, said the existing situation "must be corrected with all possible speed" to end "divided control of traffic."

He said he was confident of action on his bill at this session.

"This is only the start of the speed age," Monroney said. "This is the end of a great part of the 'see and be seen' theory—and this has to be the end of a dual system of traffic control."

Pyle said his agency was moving ahead with all possible speed, but, he said, "we are not going to solve this problem overnight."

He said the military is cooperating with CAA and the Civil Aeronautics Board. "That has not always been the case," he said.

Monroney said he could not understand why CAA could not keep military aircraft off the major civilian airways.

Both airliners involved in the recent collisions with jets were under CAA control and authorized to fly at approved altitudes when rammed by military jets.

The jets were operating on the "see and be seen" theory, but the pilots apparently did not see the civilian airliners.

PYLE SEES A PROBLEM

"I agree entirely," Pyle said, "but we have a problem. We will move as fast as we can. We've got to do it on an orderly basis." He said that to put all aircraft under control would be to ground half of them at once.

Monroney complained of the division of authority between CAB and CAA and the civilian agencies and the military. "The wild blue yonder is getting wilder all the time," he said.

Monroney said he could not understand why the military jets could not be assigned altitudes above 25,000 feet and civilian liners altitudes below. He also said the military should be kept off the airways on the "Golden Triangle"—Chicago, New York, Washington.

DISCUSSIONS ACCELERATED

Both the military and civilian flyers must make concessions to safety, he said.

Pyle promised to explore with the military the joint use of certain airways. He insisted that the public is already feeling the effect of reforms being taken, but that a great many complicated problems remain to be worked out.

"The discussions between the military and civilian authorities are at a much more accelerated pace," he said.

Under Secretary of the Air Force Malcolm A. McIntyre told the committee the Air Force has in some instances adopted rules more stringent than the CAA.

"We are striving constantly to be more responsive, but we must fly," he said. "If we attempted to segregate all military operations from civil flying either the civil or the military would as a practical matter be in substantial measure grounded."

David H. Baker, president of Capital Airlines, issued a statement demanding an immediate ban on military jet maneuvering and acrobatics on or near civilian airways.

He said the order should be accompanied by disciplinary action "to include court martial of all military pilots who violate these regulations."

Mr. KILGORE. So what you are going to do in the Air Coordinating Committee is to make the suggestion to the military that they do these and/or such other things——

General QUESADA. And they are trying to come up with things that they can think of too.

Mr. KILGORE. So insofar as this matter is concerned it is still dependent upon, we will say, your ability to persuade the military that they can accomplish these things and that they should accomplish these things? Is that true?

General QUESADA. I think that is substantially true, yes, except I want to make it crystal clear that the military is more than anxious to do anything they can. They are certainly not callous to the tragedies that have occurred on these occasions in which they were involved.

Mr. KILGORE. I am sure that is correct.

Mr. MEADER. Mr. Chairman, could I clarify a point?

Mr. KILGORE. Yes.

Mr. MEADER. Earlier I understood from Mr. Durfee that he had in his hand a press release released from the White House. Maybe I am mistaken. But it seems a little bit different from your testimony that this newspaper article is based upon a press conference held by Congressman Preston. Was there a press release issued from the White House?

General QUESADA. There was a press release issued from the White House, and if you like, I can read it.

Mr. MEADER. I think we would like to have it for the record.

General QUESADA. All right. It is public knowledge.

Mr. MEADER. Do not take the time to read it now.

Could you tell us who assisted in the preparation of the points, General Quesada?

General QUESADA. I say again the word "points"——

Mr. MEADER. Or the substance of the press release? I mean was this something that as I understand it resulted from conference with Congressman Preston and Congressman Clevenger at the White House at which you were present? Is that correct?

Mr. DURFEE. Mr. Chairman, to clarify the record, I though I read what we were referring to—an AP ticker wire report. We have one of these machines in our department. And this wire report which was handed to me about 5:30 last night is prefaced by this statement:

Five-point program calling for restrictions on military jet aircraft was anounced at news conference at the White House by Representative Preston, chairman of the House subcommittee.

That is what I was referring to, and I would not want to leave the impression this was any press release that came from the White House. I believe I read this into the record.

Mr. MEADER. Well, I had an erroneous impression, but now I discover from General Quesada there was a White House press release.

General QUESADA. There was a White House press release, and it has been appearing in the press since yesterday around noon, and here is a copy of it.

Mr. MEADER. Can we have that for the record?

General QUESADA. Would you like me to read it to you?

Mr. KILGORE. If you will.

General QUESADA (reading):

> At the request of the President, E. R. Quesada, Chairman of the Air Coordinating Committee, will hold a series of special meetings of this Committee starting tomorrow to further accelerate air safety actions and to eliminate to the maximum degree possible midair collisions. Mr. Quesada will report as soon as possible to the President on measures already taken or recommended to the Congress and other results of these special meetings. The Committee is responsible for coordinating national aviation policy matters where more than one Federal agency is involved.

Mr. KILGORE. And insofar as the five points are concerned, as I understand you, when Congressman Preston discussed this matter with the President upon the termination of his conference at the White House, he enumerated these five things and made reference to them as points?

General QUESADA. As points. Because I indicated these are some of the things that we would like to accomplish.

Mr. MEADER. Well, now, the official press release from the White House only says "hold some meetings." The newspaper article indicates that the President had issued some orders. Now, is there anything of a documentary character other than the press conference that Congressman Preston held to document those orders, if any?

General QUESADA. I do not know of any.

Mr. MEADER. I would not assume the Air Force would, all of a sudden, start changing things all around on the basis of a newspaper article. Has anything been done, as far as you know, from the White House, as indicated in the newspaper article, to instruct the Air Force to take some action along the lines of the so-called five points?

General QUESADA. The Air Force, on its own initiative, and the other services as well, have been and are exploring every possibility that can be implemented soon to assist in this situation.

Mr. MEADER. But not on the basis of any instructions from the White House?

General QUESADA. They are going to attend these meetings because the President called the Committee together.

Mr. MINSHALL. General, have any specific orders gone out telling them to curtail training flights or grounding any of the operations of any kind?

General QUESADA. No.

Mr. MINSHALL. It is all still in the discussion stage?

General QUESADA. Well, I would not call it discussion.

Mr. MINSHALL. Well, no definite action has been taken, then, other than orders to discuss it and explore it, as you said?

General QUESADA. I know of none; no.

Mr. HARDY. General, could I get into a little discussion on the authoritative responsibility of the Air Coordinating Committee? I presume you heard the discussion that we had with Mr. Durfee a little earlier on that point. Now, the White House announcement which you read says the Committee is responsible for coordinating national aviation policy matters where more than one Federal agency is involved. Now, does the Committee have any authority with respect to establishing policy?

General QUESADA. The Committee does not establish policy; no.

Mr. HARDY. What does it do?

General QUESADA. As you indicated, it coordinates policy.

Mr. HARDY. Well, what does "coordinate" mean, General? I have not learned the meaning of that word as long as I have been around Washington.

General QUESADA. Well, in this particular case, I am sure you will recognize that matters related to aviation cross many departments of Government. The State Department is interested. The Treasury is interested——

Mr. HARDY. I do not have any trouble with that phase of it, but what does the Air Coordinating Committee do about it?

General QUESADA. I am trying to tell you.

Mr. HARDY. Fine.

General QUESADA. The Post Office is interested. The services are certainly interested. The Department of Commerce is interested. The members that you heard were members are all interested. And, very often, more than 1 are interested in the same subject, and often as many as 5 or 6 or conceivably all are. And it is a medium where these agencies attempt to get together and bring about concerted action.

Mr. HARDY. How do they bring about concerted action? They cannot promulgate policy.

General QUESADA. They cannot promulgate policy, but they can agree on what each agency should do in respect to a certain problem.

Mr. HARDY. Does that bind the CAA?

General QUESADA. The actions of the Air Coordinating Committee? No; they do not. No agency is bound by Air Coordinating Committee action.

Mr. HARDY. Well, actually, then, they are just a debating society, where they get together and discuss these things? What do you do, I mean, after you get in there and argue about something? What do you do?

General QUESADA. Well, I would not deny that that has been argued or stated often.

Mr. HARDY. I am not arguing it. I am trying to understand it, General. That is all. I am trying to find out whether or not it actually does anything or just does a lot of high-sounding talking.

General QUESADA. Well——

Mr. HARDY. That is all I want to know.

General QUESADA. Well, I am not going to say it does a lot of high-sounding talking, certainly, because I am the Chairman of it.

Mr. HARDY. Then you ought to be in position to determine that as well as anybody I can think of.

General QUESADA. Well, I hope it will result in action.

Mr. HARDY. All right. Now, how do you get your action? That is the point I am trying to understand. You do not have any authority for action on your own.

General QUESADA. When there are several agencies involved, we sit around a table in good faith and try to understand the other agencies' problems and try to agree on a course of action that is to the best interests of all concerned. And the individual agencies will respond thereto.

Mr. HARDY. Now, the authority that has to apply in order to exercise that action or make it effective is the Civil Aeronautics Authority under its delegated authority from the CAB? Is that correct?

General QUESADA. That is not correct.

Mr. HARDY. Now, then, let's explore the other avenues and see where that is effective and where that is not effective.

General QUESADA. There are many subjects that come before the Air Coordinating Committee in which the CAA may have no interest.

Mr. HARDY. Insofar as voluntary action is concerned, then, the Air Coordinating Committee could debate a subject and reach an understanding where there is no specific requirement for administrative authority other than that vested in the individual agencies who participated?

General QUESADA. That is so.

Mr. HARDY. So, within that area, you could reach a voluntary decision?

General QUESADA. That is correct.

Mr. HARDY. In the area where administrative action is required, there is no authority in the Air Coordinating Committee itself, but it does substantially make decisions on which directives or regulations or rules or orders are promulgated by Civil Aeronautics Administrator? Is that right?

General QUESADA. As things stand now, the Airspace Division is used in that manner; yes.

Mr. HARDY. Well, it is used on behalf of the Air Coordinating Committee?

General QUESADA. No; it is not.

Mr. HARDY. Is it a division of the Air Coordinating Committee?

General QUESADA. It is.

Mr. HARDY. So, it is an independent agency, too?

General QUESADA. What is an independent agency?

Mr. HARDY. The Airspace Division.

General QUESADA. In effect, it is independent when the Administrator is using it. I think you are quite right. Yes.

Mr. HARDY. You have got more infernal committees than you can shake a stick at. And it is dominated by the military, too, is it not?

General QUESADA. No, sir.

Mr. HARDY. What is the percentage of representation on the military, as compared to civilian?

General QUESADA. It would not make any difference what it is. The Administrator is Chairman. There is no vote, and he does whatever he pleases.

Mr. HARDY. Well, would the Chairman always control? If so, I would take it you control the Air Coordinating Committee?

General QUESADA. I am the Chairman of the Air Coordinating Committee. There is a distinct difference, as you well know.

Mr. KILGORE. General, we told you we would be through by 3:30, and it is past that time. We appreciate very much your coming up. As the Air Coordinating Committee progresses in its discussions with respect to implementing the President's proposal, we would like very much to talk with you further.

We will be in touch with you, I think, at some later time next week.

General QUESADA. Thank you very much.

Mr. KILGORE. The subcommittee is adjourned subject to the call of the Chair.

(Whereupon, at 3:37 p. m., the subcommittee adjourned subject to the call of the Chair.)

FEDERAL ROLE IN AVIATION
(1958)

TUESDAY, JULY 22, 1958

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON LEGAL AND MONETARY AFFAIRS
OF THE COMMITTEE ON GOVERNMENT OPERATIONS,
Washington, D. C.

The subcommittee met, pursuant to recess, at 10:10 a. m., in room 1501, New House Office Building, Representative John A. Blatnik presiding.

Present: Representatives John A. Blatnik, Martha W. Griffiths, George Meader, Jack Westland, and William E. Minshall.

Also present: Curtis E. Johnson, staff administrator; Jerome S. Plapinger, counsel; and Elizabeth D. Heater, clerk.

Mr. BLATNIK. The Legal and Monetary Affairs Subcommittee of the House Government Operations Committee will please come to order.

Today we start the second phase of our 1958 hearings on the Federal role in aviation. Many of you will undoubtedly recall the subcommittee's 1956 hearings on the same subject. The first phase of our 1958 hearings occurred in May, shortly after the Brunswick, Md., crash of the Capital Airlines Viscount and the Maryland Air National Guard jet.

Our primary concern is how well the Federal Government has proceeded in matters of air safety and in preparing for passenger jet aircraft to be introduced within the next few months.

The year 1958 has been a sobering one for aviation. Two crashes between military jets and commercial airliners took a terrible toll in human life and provided unfortunate dramatization for Government failures to plan adequately for increase in the volume and speed of air traffic. If we use the lessons learned as a result of recent air accidents to avoid recurrence of past errors, we will at least resurrect some benefit from the human tragedy attending these crashes.

As a Government Operations Subcommittee, our job is to determine the economy and efficiency of the operation of Government agencies within our jurisdiction. The agencies include the CAA, CAB, and the AMB. We will hear testimony from these three Government agencies this week.

Next week we will receive testimony from private aviation trade and labor groups—the Air Transport Association, the Air Line Pilots Association, the Aircraft Owners and Pilots Association, and the National Business Aircraft Association.

During our hearings, we will be talking of many facets of aviation, but principally the following:

First, implementation of the 1956 decision designating VORTAC as the common air navigation system—and the reliability of VORTAC equipment;

Second, status of the 1955 airways modernization plan to provide air navigation and traffic control facilities and equipment.

Third, extent and effectiveness of air safety rules promulgated as a result of the recent air crashes;

Fourth, the national airport plan.

We have also advised all witnesses to feel free to comment on any other aviation matter within the subcommittee's jurisdiction. The only exception relates to matters of Government organization included in legislation now pending before the House Interstate and Foreign Commerce Committee.

Our first witness this morning, as scheduled, was to have been the Honorable James T. Pyle, Administrator of Civil Aeronautics, who was unexpectedly called to appear before another legislative committee as technical consultant and adviser to the Under Secretary of Commerce for Transportation, Hon. Louis Rothschild. He expects to be here before too much of the morning has gone by, to resume with his statement. The statement is a rather lengthy one, but well prepared. The Chair suggests that the General Counsel for the Civil Aeronautics Administration proceed with the prepared statement in the name of the Administrator.

Mr. Boyle, will you give your full name, and, for the record, your official status and time of service with the Administration.

STATEMENT OF HON. JAMES T. PYLE, ADMINISTRATOR, CIVIL AERONAUTICS ADMINISTRATION, DEPARTMENT OF COMMERCE; ACCOMPANIED BY ROBERT P. BOYLE, GENERAL COUNSEL, CIVIL AERONAUTICS ADMINISTRATION; JOSEPH H. TIPPETS, DIRECTOR, OFFICE OF AIR NAVIGATION FACILITIES, CIVIL AERONAUTICS ADMINISTRATION; DAVID THOMAS, DIRECTOR, OFFICE OF AIR TRAFFIC CONTROL, CIVIL AERONAUTICS ADMINISTRATION; ROY KEELEY, DIRECTOR, OFFICE OF FLIGHT OPERATIONS AND AIRWORTHINESS, CIVIL AERONAUTICS ADMINISTRATION; PAUL MORRIS, DEPUTY DIRECTOR, OFFICE OF AIRPORTS, CIVIL AERONAUTICS ADMINISTRATION; AND D'ARCY HARVEY

Mr. BOYLE. My name is Robert P. Boyle, and I am General Counsel of the Civil Aeronautics Administration, and, until Mr. Pyle is able to be with you, which I hope will be very shortly, I will present his statement.

Mr. Chairman and members of the committee, first of all, I would like to thank you for the invitation to appear before you and take up where we left off in the 1956 hearings on the Government's role in civil aviation.

In its letter extending the invitation, the committee indicated that it was especially interested in receiving information with respect to the following subjects:

(1) The implementation of the VORTAC decision;

(2) The reliability of the VORTAC equipment;

(3) The status of the airways modernization plan since the 1956 hearings;

(4) The extent and effectiveness of the safety rules recently promulgated as a result of the Maryland and Las Vegas crashes;

(5) Other safety measures designed to prevent recurrence of air crashes;

(6) Airport separation;

(7) The national airport plan;

(8) The status of Government activity with respect to the imminent introduction of nonmilitary jet aircraft;

(9) The status of jet noise work;

(10) The status of CAA discussions with the Civil Service Commission in connection with air-traffic controllers, traffic controller recruitment, workload, and working conditions;

(11) The operations of the Airways Modernization Board.

To the extent that such information is available to us, I will present it in the order given. I have with me the key personnel of CAA who are directly in charge of the programs to which your inquires relate, and, whenever necessary or desirable, we will be glad to elaborate on the comments I will make in my prepared statement.

At this point, Mr. Chairman, with your permission, perhaps it would be well to introduce the people who have accompanied us to this hearing, so that you will be able to query them at appropriate times. Seated first, on my left is Mr. Joseph H. Tippets, Director of the Office of Air Navigation Facilities.

Next to him is Mr. David Thomas, who is Director of the Office of Air Traffic Control.

Next to him is Mr. Roy Keeley, Director of the Office of Flight Operations and Airworthiness.

And next to him is Mr. Paul Morris, who is the Deputy Director of the Office of Airports.

These gentlemen will, from time to time, elaborate on the comments that we have made in the prepared statement, and will be available to answer any questions as we get into the details of these programs.

Resuming the statement.

THE IMPLEMENTATION OF THE VORTAC DECISION

The Air Coordinating Committee's VORTAC recommendation, adopted on August 30, 1956, outlined courses of action in the three broad areas of (1) ground equipment; (2) airborne equipment, and (3) international acceptance of a new standard for distance-measuring equipment.

Perhaps at this point, Mr. Chairman, in order to explain graphically the problem that is involved in the decision between VOR/DME

and VOR/DME–TACAN, it would be wise to have Mr. Tippets explain three charts that I believe would set forth this problem in a fairly graphic manner.

Mr. TIPPETS. Thank you, Mr. Boyle.

Mr. Chairman, I appeared at the last hearings of the committee, and discussed certain technical data pertaining to the VOR/DME–TACAN matter. Perhaps it would be of interest to review again the background on the VORTAC decision, what it means, what its implications are, and where we now stand.

In the middle and late 1940's, the Civil Aeronautics Administration embarked on a program of implementing the United States Federal Airways with the facility known as VOR, a ground electronics station that provides bearing for the pilot, telling him the direction in which he is going toward the particular station or away from the particular station.

At the same time, there was developed in this country a device known as distance-measuring equipment, which told the pilot, in addition to his bearing from a station provided by the VOR, how far in miles he was from that station.

Mr. MEADER. Mr. Tippets, may I interrupt? What does "VOR" stand for?

Mr. TIPPETS. Visual omnirange. It means in the cockpit the pilot can pictorially see the direction of his flight.

The "V" stands for two things, "visual" and "VHF," which means it is in a frequency band which is static free. Static was one of the deficiencies in early navigation systems. We used a low-frequency band, which is subject to static interference; we moved to the very high frequency band, as it was called in those days, to avoid the static.

We have these two facilities, called the visual (very high frequency) omnirange, and the distance-measuring equipment.

Mr. PLAPINGER. Excuse me, Mr. Tippets. Is it true the International Civil Aviation Organization adopted VOR in 1947 as an international standard with the idea the United States would develop compatible distance-measuring equipment?

Mr. TIPPETS. That is true. As a matter of fact, last November and December, the International Civil Aviation Organization put a new protection date on VOR, which means it will not be phased out, even if a new system were developed, prior to 1966. The VOR is not only a domestic United States aid; it is an international standard aid.

Around the time of the Korean war, the military found it ncessary to develop a navigation aid that would have certain operational characteristics that would meet their needs, not only overland, but their shipborne needs and their tactical mobile needs overseas. They developed the military system known as TACAN (tactical air navigation).

The TACAN system provides bearing information and distance information somewhat comparable to the bearing information provided by the civil device known as VOR, and the distance device known as DME.

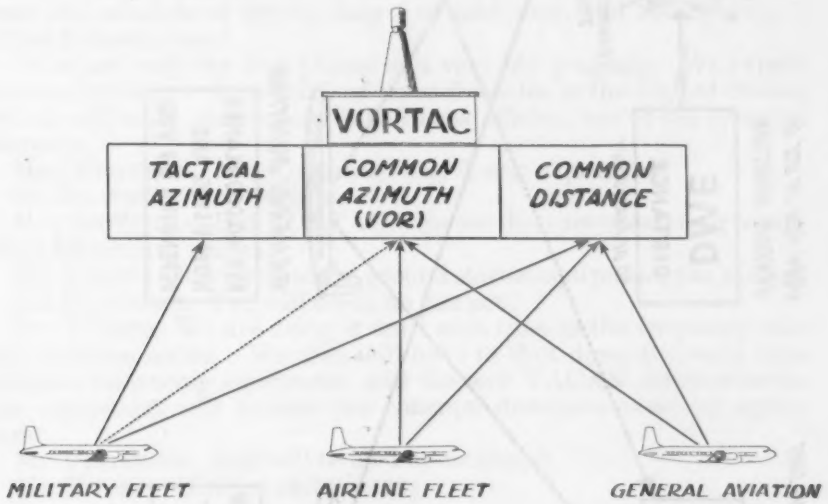
The conflict of these devices was quite a technical one, but a very real and severe one, in that the distance information equipment for

both the military system and the civil system were in the same frequency spectrum; it was not possible to implement both systems without having a major conflict of emission interference which would make both systems unusable.

The President's Air Coordinating Committee, in 1956, after many very careful and searching technical sessions, concluded that it would be to the best national interests of the United States—and this was agreed in the Air Coordinating Committee, where all elements of civil and military parts of Government are represented—to drop the civil DME that had been implemented in the ground environment, and adopt what has commonly become known as the VORTAC system.

This would mean the continuation of the VOR, or the civil bearing ground stations, superimposing on the VOR the TACAN, the Military Tactical Air Navigation System, to provide the military with its necessary bearing information, and to make available to both civil and military flying the distance information which could be operationally compatible to both needs.

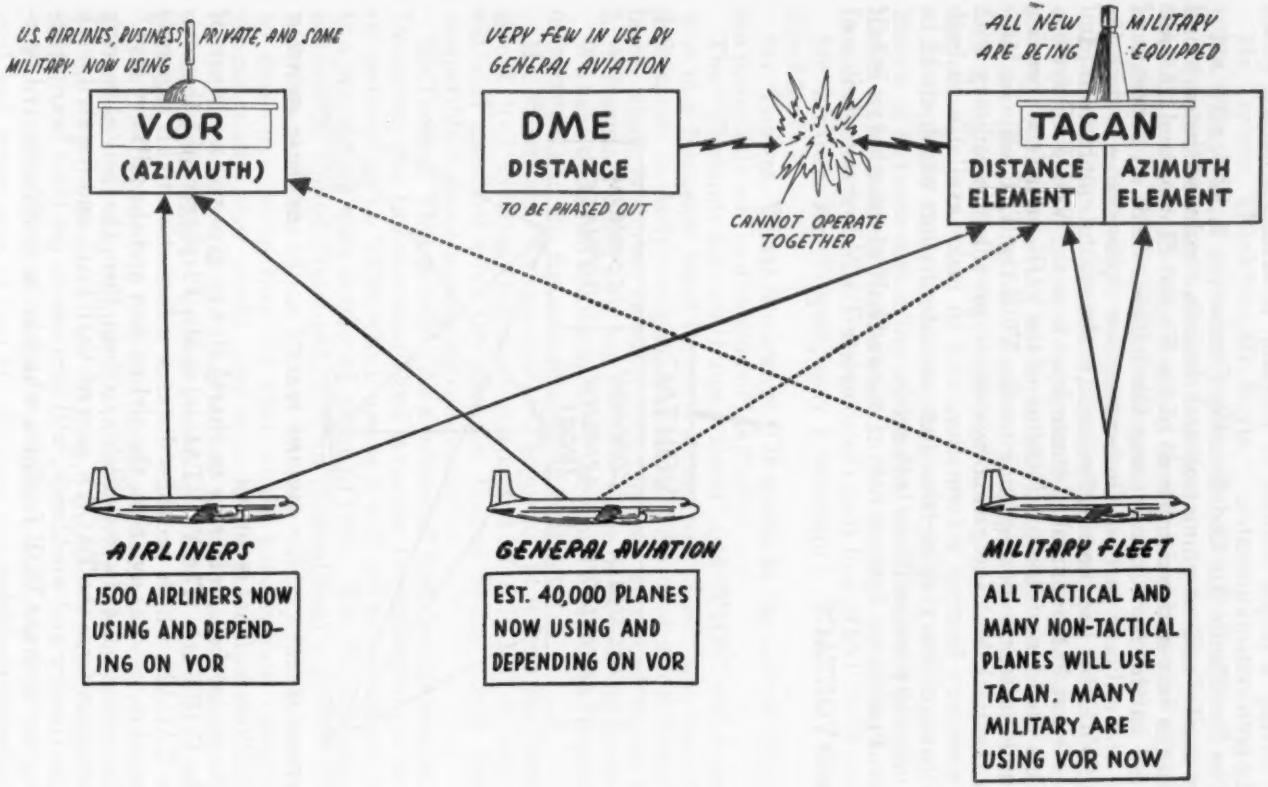
Mr. PLAPINGER. It is not half of one and half of the other; it is half of the VOR/DME, and then the complete TACAN system, is it not? That is VORTAC?



Mr. TIPPETS. That is correct.

I have sketched [referring to chart] this to give you a picture of of the VORTAC. The VORTAC is, as Mr. Plapinger said, the complete TACAN, which provides distance information to all segments of aviation, general aviation, the airline fleet and the military fleet.

The military fleet have available to them, then, the tactical bearing information from the TACAN part of VORTAC, and the civil, both in this country and worldwide, will continue to get their bearing information from the VOR facilities, which is the worldwide civil bearing information device.


U.S. AIRLINES, BUSINESS, PRIVATE, AND SOME MILITARY. NOW USING
VOR
(AZIMUTH)
VERY FEW IN USE BY GENERAL AVIATION
DME
DISTANCE
TO BE PHASED OUT
CANNOT OPERATE TOGETHER
ALL NEW MILITARY ARE BEING EQUIPPED
TACAN
DISTANCE ELEMENT
AZIMUTH ELEMENT
AIRLINERS
1500 AIRLINERS NOW USING AND DEPENDING ON VOR
GENERAL AVIATION
EST. 40,000 PLANES NOW USING AND DEPENDING ON VOR
MILITARY FLEET
ALL TACTICAL AND MANY NON-TACTICAL PLANES WILL USE TACAN. MANY MILITARY ARE USING VOR NOW

This decision was reached in 1956.

We explained this action to this committee in 1956, and subsequently went before the Appropriations Committee and requested funds to implement the system.

I believe this relates to the first question raised by the committee to the Administrator. We are pleased to report that the VORTAC program projected here and before the Appropriations Committee in 1956 is on schedule.

Our program commitments were these: We knew that the oncoming civil jets were going to have some additional requirements for bearing and distance information. The military jets were already in the system and had an urgent need for the TACAN part of the VORTAC system, and a very careful implementation plan was developed which stated specifically that it would be necessary by July 1, 1959, to have some 258 VORTAC stations commissioned; and, by July 1, 1960, to have a total of 346.

This plan commonly became known as phase 1 and phase 2.

The orders for these equipments were placed on a cooperative basis between the CAA and the military departments. The equipments are all on order. The manufacturers are now in delivery of some of the earlier equipments, and as of this moment it appears that we will meet the schedule of 258 by July 1 of next year, and 346 by July 1 of the following year.

These are only the first phases of a very big program. We expect eventually to have some 1,200 of these facilities in the United States, which will make more effective and more efficient use of the common airspace.

Mrs. GRIFFITHS. Mr. Chairman, may I ask a question?

Mr. BLATNIK. Mrs. Griffiths.

Mrs. GRIFFITHS. Did VORTAC wipe out distance-measuring equipment for civilian planes?

Mr. TIPPETS. It wiped out the ground station equipment, yes, ma'am.

Mr. PLAPINGER. You still use it, do you not?

Mr. TIPPETS. We are using it until such time as the frequency conflict becomes severe. We then will have to shut down the early type distance-measuring equipment, and the new TACAN distance-measing equipment will become the common distance-measuring equipment.

Mr. PLAPINGER. And will be used by civilians?

Mr. TIPPETS. Civilian and military.

Mr. PLAPINGER. There is no requirement now that civilian planes use TACAN?

Mr. TIPPETS. There is no requirement, but it will be available for them when it is installed.

Mr. PLAPINGER. Will there be a requirement that they use it?

Mr. TIPPETS. There will be a requirement for distance information, whether it comes from TACAN or however it may come.

The numbers of airplanes, the kinds of routes we have, the width of routes, the turn radii, and all the technical features that go with the airways will require precise distance-measuring information by 1965.

Mr. PLAPINGER. You mentioned 1,200 units of VORTAC. I think your plan refers to 1,250 by 1965.

Mr. TIPPETS. Yes, sir.

Mr. PLAPINGER. I am not concerned with the difference so much as I am with: What will be the total cost to CAA by 1965, assuming the 1,250 units are used?

Mr. TIPPETS. About $300 million when the total ground environment is installed.

Mr. PLAPINGER. Does this include maintenance and operation, or is it just the cost of the equipment?

Mr. TIPPETS. This is the capital investment for the ground facilities.

Mr. MEADER. Is that the total cost, or just CAA's share of it?

Mr. TIPPETS. This is the total ground cost. This is not the military or the civil airborne equipment cost that will be—it is just ground environment.

Mr. MEADER. Just ground environment cost, but is that not shared with the military? Are they not contributing to this?

Mr. TIPPETS. Yes, sir, the Appropriations Committee last year (1958) instructed the military to transfer to us 21½ million—I will correct these figures if they are wrong—and transfer to us 16½ million for their share in 1959.

Mr. MEADER. But the $300 million is the total cost, including the cost of the military?

Mr. TIPPETS. Yes, sir.

Mr. PLAPINGER. Exclusive of maintenance?

Mr. TIPPETS. Yes, sir, maintenance costs are separate and above. This is capital investment.

Mr. PLAPINGER. What are these projected costs? Is this not in the airway plan?

Mr. TIPPETS. Yes, it is, but not broken out quite that way, Mr. Plapinger. I would have to give you a unit cost and multiply it by the total number of facilities.

But, to precisely answer your question, this is only the capital investment cost.

Mr. PLAPINGER. Could we have that other information for the record?

Mr. TIPPETS. Yes; we can furnish it.

(The information is as follows:)

Federal airway plan—Maintenance and operation (O. and R.) costs, schedule for fiscal years 1959–63

Facilities or services	Fiscal year 1959		Fiscal year 1960		Fiscal year 1961	
	Positions	Amount	Positions	Amount	Positions	Amount
Long range radar	1,374	$10,687,195	3,465	$23,907,000	5,364	$43,865,000
Terminal area radar	2,373	19,853,156	3,546	28,132,000	4,312	37,877,000
Air route traffic control centers	6,949	57,287,633	8,159	83,618,000	8,830	98,768,000
Airport traffic control towers	4,456	33,509,109	5,193	42,921,000	5,685	50,116,000
Air traffic communication stations	5,325	38,561,682	5,576	46,078,000	6,033	51,498,000
International ATC stations	1,161	9,668,646	1,200	11,188,000	1,236	12,072,000
Air navigation facilities (VORTAC)	1,900	18,875,786	2,762	31,698,000	3,049	40,494,000
Instrument landing systems	793	6,659,411	888	7,810,000	974	9,011,000
Approach lighting	170	1,849,962	254	2,719,000	320	3,804,000
L/MF facilities	628	6,672,846	609	7,225,000	609	7,425,000
Intermediate fields and light beacons	89	1,224,574	86	1,346,000	86	1,400,000
Total	25,218	204,850,000	31,738	286,642,000	36,498	356,330,000

Facilities or services	Fiscal year 1962		Fiscal year 1963	
	Positions	Amount	Positions	Amount
Long range radar	6,891	$62,344,000	8,143	$78,239,000
Terminal area radar	5,030	46,508,000	5,629	54,745,000
Air route traffic control centers	9,504	111,318,000	10,225	123,961,000
Airport traffic control towers	6,076	56,204,000	6,478	62,194,000
Air traffic communication stations	6,494	58,011,000	6,969	64,938,000
International ATC stations	1,313	13,207,000	1,352	14,400,000
Air navigation facilities (VORTAC)	3,831	49,708,000	4,560	62,833,000
Instrument landing systems	974	9,790,000	1,249	11,703,000
Approach lighting	327	4,440,000	361	4,908,000
L/MF facilities	609	7,722,000	609	8,031,000
Intermediate fields and light beacons	86	1,456,000	86	1,514,000
Total	41,135	420,708,000	45,661	487,466,000

Mr. PLAPINGER. And that does not include work that may be done by your research arm or the Airways Modernization Board?

Mr. TIPPETS. No; this is just the procurement from industry manufacturers of the ground VOR's and the ground TACAN's, the buildings, the powerplants, the power distribution systems, and all plant and the electronic facilities that go with it.

Mr. PLAPINGER. You have that in it. Do you happen to know what the military has spent in developing this system?

Mr. TIPPETS. No, sir; I do not know. They have on order now some 29,000 airborne units to go with the system in the airborne environment, they have also on order some 250 to 300 ground stations for United States base only, and for overseas use.

The research and development costs I do not know.

Mrs. GRIFFITHS. When did they develop a TACAN that actually worked?

Mr. TIPPETS. The technical concepts of the system were developed, I would say, in 1948 or 1949, somewhere along there, they entered into contracts with manufacturers for the prototype and the development of production equipment.

There are a number of manufacturers building TACAN now, the military-type TACAN.

We have on order, too, at the moment, a civil version of the military-type TACAN, and that will be instilled in the phase 2 part of the program I have been describing.

Mrs. GRIFFITHS. How many of their planes did you say were equipped with it now?

Mr. TIPPETS. The military have some 29,000 airborne units on order. I do not know how many planes are equipped, but it is a large number.

Mrs. GRIFFITHS. And do they have ground installations?

Mr. TIPPETS. They are only providing ground installations overseas, and domestic bases not part of the——

Mrs. GRIFFITHS. Do you know positively they have a single piece of equipment that works?

Mr. TIPPETS. Yes, ma'am.

Mrs. GRIFFITHS. I investigated this on another committee. They had spent $250 million and did not have anything that worked. They had them stored all over the country.

Mr. PLAPINGER. Do you have one that works?

Mr. TIPPETS. We have one ground VORTAC station in at Phillipsburg. We have 27 others that began operation around July 1 and are now operating.

When you say "does it work," any electronic device is subject to tube failures and factors that are true of any electrical device.

When you ask, "Do they work?" the answer is, "Yes." We have designed them so they will work.

There have been difficulties in some of the early TACAN units, both airborne and ground. I would be dishonest if I did not say this is so. But this is true in any new electronic system. When you develop a new gadget, you go through a period of refinements and improvements and each specification we write each year is an improvement over the previous year's, and we try to improve on any deficiencies which we have observed.

Mrs. GRIFFITHS. But they were running out production contracts without a single working model. They were buying it as a production item, and did not have a single working model.

Mr. TIPPETS. I could not answer for them. But they do have units in use. The Navy has them in use at sea, and in use in other places in this country. Maybe they have had a problem of maintenance in some areas, but there are some military aircraft TACAN equipped, and they are using them, the Navy particularly.

Mrs. GRIFFITHS. But they have no requirement that they be put on every plane?

Mr. TIPPETS. There is no regulation that requires this yet. As I mentioned, when we get into the vast use of the airspace, even greater than we now have, and have our airways widths and separation standdards as contemplated, it will be essential that some precise distance knowledge be known to the pilot and the controller.

There are a number of ways you can get distance information, but as of the moment the United States feels this is the best and most accurate way of getting it.

There are always a lot of new developments and systems in the offing. We have to deal with the situation as it is today.

Mrs. GRIFFITHS. And is any civilian organization now set up which will have the authority to demand that the military use this equipment, or install it?

Mr. TIPPETS. I think Mr. Boyle could probably speak better to this. This deals with legislative and legal prerogatives of the Government to enforce the need for devices in an aircraft. I presume the new FAA will have such authority if it is deemed operationally desirable.

Is that not correct, Mr. Boyle?

Mr. BOYLE. That is correct. The present law is adequate for the purpose of requiring distance information in the cockpit if the condition in the airspace is such as to make it a safety necessity.

I think that the answer to the problem is that at the moment, so far as studies have progressed on it, the Civil Aeronautics Board, which is responsible for the issuance of that type of rule, would not be convinced that this is a requirement in today's airspace.

As Mr. Tippets said, it may be a requirement in tomorrow's airspace, in which case, under existing law or under the proposed law, the authority to require the airborne equipment is available.

Mrs. GRIFFITHS. Of course, if it is a requirement in tomorrow's airspace, a demand must be made at once, or you will not have the equipment when you have the need.

Mr. BOYLE. You are obviously correct that there is a certain amount of lead time required in order to obtain the necessary airborne equipment.

As Mr. Tippets has explained, we are putting in the ground equipment which is the basis upon which the airborne equipment must work. With that in being, the requirement of airborne equipment is, to some extent, a lesser task.

Mrs. GRIFFITHS. Why do you feel there is no requirement today for this type of thing?

Mr. BOYLE. I would hesitate to say that there is no requirement today. I think it is a question of balance between the feasibility, and the cost of the improvement and the actual improvement in today's airspace that you would obtain from such a requirement.

Mr. Thomas, who is in charge of our Office of Air Traffic Control, could probably speak much more authoritatively to the problem of the need in today's airspace for this.

Mr. THOMAS. Mr. Chairman, we have been looking forward to a requirement, and have specified a date of 1965, with this being about the time that we will see the congestion in the airspace such as to require the narrower route widths that we could obtain with this equipment, and better traffic services.

If a requirement were specified today, we would have difficulty in convincing even ourselves that the high cost—and there is a high cost associated with distance-measuring equipment of any sort—would be justified.

Mrs. GRIFFITHS. For the inferior piece of equipment that TACAN is?

Mr. THOMAS. Well, for any type of distance-measuring equipment there is a very high cost. We would be, I think, ruling a lot of the airplanes that now enjoy the airspace out of the air by having this requirement.

We feel it would be an abritrary action at this time, even though from an operational viewpoint it would be desirable.

There is a weight factor involved for the light aircraft; a power factor in electrical current systems; there is an expense factor; there is a maintenance factor. And we do not feel that we have yet reached the point of congestion where we could recommend to the Board, the Civil Aeronautics Board, an action that would be as harsh as this action would be at the present time.

Mr. TIPPETS. Mrs. Griffiths, one carrier has placed a firm order for distance equipment in their new, upcoming jets, and at least three others are now negotiating with manufacturers for distance-measuring equipment of the TACAN type in their jet fleets, and some even plan to retool their present aircraft.

This program is evolving pretty much as I think we have expected it would.

When you get more and faster airplanes, and the routes become more congested, and a larger number of routes needed, the requirement would be more apparent.

Mr. MEADER. Mr. Tippets, does that suggest that the civil air fleet does not now have this distance-measuring equipment of the CAA type?

Mr. TIPPETS. They do not now have distance-measuring equipment of any type.

Mr. MEADER. So there will not be any loss when the TACAN distance-measuring equipment displaces the civilian one?

Mr. TIPPETS. As far as the scheduled carriers are concerned; yes, sir. There are a lot of general aviation and business-type company airplanes that do have distance-measuring equipment that is compatible with the earlier ground stations and they are using it. They will have many years of use of this before it is finally phased out and new equipment takes over.

Mr. MEADER. And I understand the DME is not convertible to the TACAN.

Mr. TIPPETS. No, sir; it is not.

Mr. MEADER. They just have to throw the whole thing away?

Mr. TIPPETS. Those who have it. It is true that after it has had a considerably long life, they will be faced with the decision to phase that out and buy the new. But they have been using this for many years, and they will have 4 or 5 more years, in most instances, of use of it before this becomes necessary.

Mr. MEADER. And it is impossible to convert?

Mr. TIPPETS. That is right; not economical to do so.

Mr. PLAPINGER. Are you required to certificate the airborne distance-measuring equipment?

Mr. TIPPETS. The Flight Operations Office of CAA will deal with the form of the TSO, the technical standard order, like the other airborne devices.

Mr. PLAPINGER. Have you certified the equipment on order by the commercial airlines?

Mr. TIPPETS. I do not know about the specifications.

Mr. KEELEY. I cannot answer that question specifically.

Mr. PLAPINGER. Would that be in your office, Mr. Keeley?

Mr. KEELEY. Yes.

Mr. PLAPINGER. If you can, will you find that out?

(The information is as follows:)

The CAA has not as yet issued any technical standard orders for airborne distance-measuring equipment. Airborne distance-measuring equipment was originally issued a CAA-type certificate under part 16 of the Civil Air Regulations. The minimum performance standards used as a guide in type certificating DME (attachment 1, see below) were prepared by the CAA Air Frame and Equipment Branch and were predicated on the original CAA procurement specifications developed by the Office of Air Navigation Facilities and were designed to meet the standards outlined in ICAO Annex 10. Three companies (Hazeltine, Narco, and Bendix) obtained type certificates for airborne DME. This involved CAA participation in their testing programs and a complete analysis of all the tests conducted:

Part 16 of the Civil Air Regulations was rescinded effective January 1, 1958, and after such date airborne radio equipment airworthiness would be handled through the technical standard orders.

The Radio Technical Commission for Aeronautics (RTCA) minimum performance standards for DMET (TACAN) are in the final stage of development and when they are made available they will be referenced in a technical standard order.

The third draft of the RTCA standards for DMET is attached as attachment 2. (See appendix exhibit, p. 447.)

ATTACHMENT 1

DEPARTMENT OF COMMERCE,
CIVIL AERONAUTICS ADMINISTRATION,
Washington, D. C., August 25, 1953.

(Change "A")

MINIMUM PERFORMANCE STANDARDS TO BE USED AS A GUIDE IN TYPE CERTIFICATING AIRBORNE DISTANCE MEASURING EQUIPMENT

1.0 GENERAL.

1.1 *Ratings of components.*—The equipment should not incorporate in its design a component of such rating that, when the equipment is operated throughout the range of the specified environmental tests, the rating established by the manufacturer of the component is exceeded. For electron tubes, the pulsed or continuous commercial service rating of the tube manufacturer is applicable except for the heaters and filaments. The voltage applied to the heaters and filaments of electron tubes should be within 5 percent of the manufacturer's rating when the equipment is operated under standard operating conditions.

1.2 *Operation of controls.*—The design of the equipment should be such that the controls intended for use during flight cannot be operated in any possible position combination or sequence which would result in a condition whose presence or continuation would be detrimental to the reliability of the equipment.

1.3 *Accessibility of controls.*—Controls which are not normally adjusted in flight should not be readily accessible in flight.

1.4 *Effect of tests.*—The design of the equipment should be such that the application of the specified tests will produce no condition detrimental to the reliability of the equipment.

2.0 GENERAL STANDARDS.

2.1 *Environmental test procedures.*—The environmental test procedures contained in Radio Technical Commission for Aeronautics Paper entitled "Environmental Test Procedures—Airborne Radio Equipment" (Paper 50-52/DO-44

dated March 20, 1952) or the currently used tests contained in Civil Aeronautics Manual 16 will be used at the option of the applicant.

2.2 *Standard operating conditions.*—

Ambient temperature: 20 degrees ±10 degrees C.
Normal room humidity and barometric pressure:
DC voltage: 27.5 v ±5 percent
AC voltage (both sources): 115 v ±5 percent
AC frequency (both sources): 400 cycles ±5 percent
Warmup period: 15 minutes

2.3 *Ground station.*—The equipment should be designed to work with a ground station having the performance characteristics outlined in attachment B of Annex 10 of the International Civil Aviation Organization dated May, 1950.

2.4 *Alarm warning.*—Suitable provision should be incorporated in the equipment to indicate when no correct distance information is available.

2.5 *Warmup time.*—During the warmup interval, the transmiter should remain inoperative and the distance indicator should indicate that no correct distance information is available.

2.6 *Identity.*—Suitable circuitry should be incorporated in the equipment to satisfactorily identify the transponder's third pulse identity signal.

2.7 *Accuracy of equipment.*—The accuracy of the indication should be within ± ½ mile or ± 3 percent, whichever is greater, in aircraft having speeds up to 700 knots.

2.8 *Generated interference.*—The equipment should generate no spurious signals which might adversely affect other equipment installed in the aircraft.

3.0 CHANNELING.

3.1 *Frequency assignments.*—The interrogator should operate within the following frequency bands: The transmitting frequencies should be 960–987.25 megacycles, and the receiving frequencies should be 1187.25–1215 megacycles. There should be 10 transmitting frequencies and 10 receiving frequencies with 2.5 megacycle center-to-center separation between adjacent radio frequency assignments. Specific center frequency assignments should be as specified in paragraph 2.2.1.1, attachment B of Annex 10 of the International Civil Aviation Organization dated May, 1950 which allows for guard bands.

3.2 *Moding.*—To minimize the effect of undesired signals, 10 pulse multiplex code combinations of 2.5 *us* duration pulses will be used for interrogation and 10 pulse multiplex code combinations, of the same pulse duration for reply. For interrogation, the spacing between pulses of a pair for the first code combination should be 14 *us* and should increase by 7 *us* for each successive code combination. For reply, the spacing between pulses of a pair for the first pulse pair combination should be 77 *us* and should decrease by 7 *us* for each successive code combination. By the use of the above pulse multiplex code combinations, 10 modes of operation should be obtained. The required modes and their designation letters are given below:

DME modes and designations

Mode designation	Spacing of interrogation pulses, *us*	Spacing of 1st and 2d reply pulse, *us*
A	14	77
B	21	70
C	28	63
D	35	56
E	42	49
F	49	42
G	56	35
H	63	28
I	70	21
J	77	14

3.3 *Channels.*—The equipment should operate on all 100 channels indicated in paragraph 2.2.1.1, attachment B of Annex 10 of the International Civil Aviation Organization, dated May 1950.

3.4 *Remote channel selection.*—Provision should be made for remote channel selection by means of a standard VOR/glide slope/DME frequency selector. The

DME receiving frequency should be selected by means of the megacycle control, and the DME transmitting frequency should be selected by means of the 10th megacycle control of the standard frequency selector. The proper mode for each combination of the transmitting and receiving frequencies should be automatically set by a mechanism contained within the equipment. Upon the selection of a new frequency on the frequency selector it should take no longer than 10 seconds for the equipment to complete the selection of the proper operating channel. The operating channel selection system should be designed to function properly under the low temperature conditions stated herein. Selection of a frequency over 117.9 megacycles should not result in constant cycling of the channel selection circuits. At any time when the navigational equipment is operating at frequencies over 117.9 megacycles, the transmitter should be inoperative so as not to cause unnecessary noise.

3.5 *Zero distance indication.*—The interrogator should be designed to indicate zero distance for a nominal system delay of 115 *us*, and should actually indicate zero distance within the specified tolerances with reply signals of all levels from 0 to 60 *db* above minimum tracking level.

3.6 *Time delay.*—There should be a time delay of 115 *us* between the transmission of the second constituent interrogation pulse and the instant the measuring circuits reach the condition corresponding to zero distance.

3.7 *Pulse repetition rate.*—The equipment should transmit pulse pairs at an average repetition rate of not more than 30 pulse pairs per second when averaged over a period of 10 minutes. In no case should the pulse repetition rate exceed 35 pulse pairs per second.

3.8 *Interrogation jitter.*—There should be a random variation in the time between transmission of successive pairs of interrogation pulses of at least 1 percent.

3.9 *Antenna coupling.*—Where the receiver and transmitter are coupled to an antenna through the same coaxial line, the receiver should not be damaged by the transmitter under any condition of mismatch.

4.0 TRANSMITTER MINIMUM PERFORMANCE REQUIREMENTS.

4.1 *Transmitter pulse shape.*—The pulse rise time should be less than 0.3 *us*, the pulse width should be 2.5 ± 0.2 *us* and the decay time less than 0.5 *us*. Between the points *b* and *c* defined on fig. 1, the amplitude of the pulses should not differ by more than $+2$ *db* or -1 *db* from the amplitude A. The spectrum of the pulses should be such that at all frequencies separated from the radio frequency of operation by more than 1 megacycle the energy level will be more than 14 *db* below the energy level at the operating radio frequency. In the case of frequencies differing from the radio frequency of operation by more than 10 megacycles, the energy level should be more than 30 *db* below the level at the operating radio frequency.

4.2 *Transmitter frequency stability.*—The transmitter frequency should remain within ± 400 kilocycles of its specified frequency on all channels under conditions of mismatch corresponding to a voltage standing wave ratio of 1.4 or less.

4.3 *Transmitter power output.*—The peak power output of each transmitted pulse (measured at the antenna terminal of the equipment) should be not less than 500 watts. The peak power of the constituent pulses of a pair should not differ by more than 1 *db*.

4.4 *Transmitter pulse spacing.*—The spacing between the constituent pulses of a pair should be within ± 1 *us* of the nominal value.

5.0 RECEIVER MINIMUM PERFORMANCE REQUIREMENTS.

5.1 *Pulse acceptance.*—The receiver should be designed to offer maximum acceptance to pulses having the form specified in 4.1.

5.2 *Sensitivity.*—Under normal fruit conditions, the signal level required for locking should be not greater than -75 *dbm*, and for tracking not greater than -78 *dbm*. Under maximum fruit conditions, deterioration of these sensitivity levels should not exceed 3 *db*. The sensitivity determinations should be based on an average of nine out of ten successful ends of search at the specified signal levels.

5.3 *Stability and bandwidth.*—The center-frequency stability should be at least ± 0.9 megacycles and the minimum bandwidth for that stability should be no less than 2.0 megacycles. For any additional increase in the center-frequency stability, the minimum bandwidth may be correspondingly reduced, provided that the equipment will reliably meet the system's accuracy requirements specified in paragraph 2.7.

5.4 *Receiver response.*—The response of the receiver should be such that signals 30 *db* above the minimum sensitivity level for tracking of the correct mode but 7.5 megacycles removed, will not result in an average of more than 1 successful end of search out of 10 tries, provided that, if such a successful end of search occurs, the equipment will not remain in a tracking condition longer than 5 seconds before resuming search.

5.5 *Decoder.*—The receiver should incorporate circuitry such that the distance indication is presented when received pulse pairs are spaced at or within 0.5 microseconds of the proper spacing. However, signals which are at or within 2 microseconds of the remaining nine improper spacings should be rejected if the signal level of these signals is between the minimum sensitivity level and −20 *dbm*.

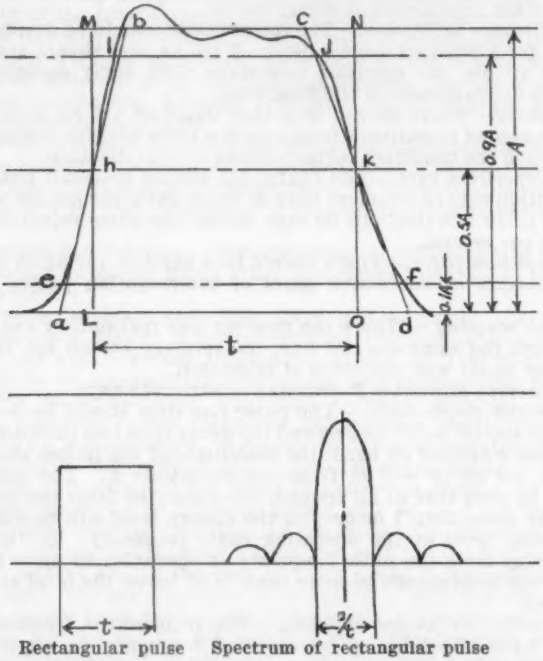


FIGURE 1.—*Definition of pulse shape and radio frequency spectrum point*

CONSTRUCTION OF EQUIVALENT RECTANGULAR AND TRAPEZOIDAL PULSE SHAPES

1. By successive approximation obtain rectangular pulse (amplitude *A*) of area equal to area under actual pulse and passing through the 0.5A points (*h*, *k*) on the actual pulse envelope. This is rectangle *lmno*.

2. Choose points *of* and *ij* on the actual pulse at 0.1A and 0.9A levels respectively.

3. Through *h* draw *ahb* parallel to a straight line connecting *e* and *i*. Through *k* draw *dkc* parallel to a straight line connecting *f* and *j*. Then equivalent trapezoidal pulse is *abcd*.

NOTE.—Area *abcd*=Area of rectangle.
=Area of pulse.

DEFINITIONS

1. The pulse amplitude is specified as "A."

2. The pulse length is specified as "+," i. e. the time interval between 0.5A points on the pulse.

3. Rise time, as used in this specification, is that portion of the total rise time required for the pulse to change from 0.1A to 0.9A.

4. Decay time, as used in this specification, is that portion of the total decay time required for the pulse to change from 0.9A to 0.1A.

5. The frequency of operation is the mean frequency of a band

$$\Delta f = \frac{2}{\text{pulse length}}$$

chosen from the spectrum so as to include the maximum power.

Mr. KEELEY. Yes. As Mr. Tippets stated, it is built to a technical standard order that is issued by CAA and compliance with that order would be tantamount to certification.

Mr. PLAPINGER. Have you issued that technical standard order?

Mr. KEELEY. The technical standard order, I believe, has been out for some time.

Mr. TIPPETS. I think that is correct. The specification was developed by the Aeronautical Radio who represent the airlines on such technical matters, predicated on the Government's ground environment technicques and devices, so that they are fully compatible in that regard. The Aeronautical Radio and airlines have approved a specification, which I do not know the exact status of, but which obviously would have to meet the TSO Mr. Keeley speaks of.

Mr. PLAPINGER. What I am trying to get at is: Has CAA tested the airborne equipment?

Mr. TIPPETS. Not in the form of a test—I do not know. Mr. Keeley would have to speak to that.

Mr. KEELEY. No, sir, I do not believe we have.

Mr. PLAPINGER. Would you issue a technical standard order without having tested the equipment?

Mr. KEELEY. The technical standard order sets up the requirements to meet certain conditions, and the equipment is built around these technical standards that are established.

Mr. PLAPINGER. Mr. Keeley, what I am driving at is: How can you set up standards until you have tested? That is what I would like to know.

Mr. KEELEY. This is developed by our technical people, what the requirements are to fit this equipment. The equipment is developed—my office has nothing to do with the development of the equipment, the TACAN equipment, the measuring devices.

Mr. PLAPINGER. I see a helping hand in the legal department here.

Mr. BOYLE. Mr. Plapinger, it works this way: We develop an order which sets forth certain requirements that a certain piece of equipment must meet. It must be able to do these things: A, B, C, D, E, F, and G.

When the manufacturer makes the equipment, he certifies that his equipment will meet the objective standards that are set forth in the technical standard order. They include such things as reliability, performance standards, and so forth, that are set forth in an objective way.

And it must be done this way in order to avoid preferential treatment of somebody's particular design and to avoid patent problems.

Mr. PLAPINGER. Now, the manufacturer certifies that his equipment meets the requirements of the technical standard order?

Mr. BOYLE. That is correct.

Mr. PLAPINGER. And do you in turn check that to see whether this is so?

Mr. KEELEY. We do conduct surveillance on that type of equipment; yes, sir.

Mr. BOYLE. There are two kinds of ways in which this check is actually accomplished.

It is done, for instance, on a route check of an airline. The inspector of CAA will be riding in the cockpit and will be able to determine whether or not that particular piece of equipment is able to produce the information that the technical standard orders requires that it produce.

There is another way in which that is done. The air navigation facility people also ride the cockpit for the purpose of determining the performance of our ground aids in actual operation in the aircraft. As a part of this, they obviously are also able to determine whether or not the airborne equipment is actually producing the information in the cockpit it is required to do.

Mr. TIPPETS. Perhaps another point, Mr. Plapinger, is that over the years, of course, since the very first homing type devices, low frequency ranges, the VOR, industry and ourselves have had a tremendous amount of experience in component reliability and component tolerances. These TSO's are very tight, both for civil and military purposes, and it is a continuation of some very, very high standards for reliability and accuracy purposes.

Actually the evolution of this is quite orderly, not very revolutionary, the manufacturers are not interested in building something that will not meet the TSO requirement, they know it will not only be rejected, but it looks bad for them.

From a safety point of view, we cannot afford to have them built to lesser standards.

We have had a lot of experience in this, and we feel there will be no real problem in this regard because the military have, over a period of years, put an awful lot of money into the development of this kind of equipment, and we are taking advantage of all the experiences they have had, both the good and the bad ones.

Mr. PLAPINGER. In your own publication, Jet Age Planning, there is reference to a 110° cone of silence; in other words, in which there is no signal over the station. We heard that the distance measuring portion is off from half to three-quarters of a mile, that the indicators go into search in various areas—I am speaking with respect to TACAN's deficiencies—and all this against the system VOR–DME that was operational; am I right? Was it operational in 1956?

Mr. TIPPETS. Not all the DME, but about half of the system was in operation.

Mr. PLAPINGER. But I think it was being used at that time by a number of people.

Mr. TIPPETS. The VOR has a narrow cone. The TACAN has had a very broad cone, but with developments such as new antennas, we are able to tighten these. The TACAN cone is still broader than the VOR cone, but this is not too important in the way we use it. It is a problem, but it is not of the significance given to it a few years ago. Uses have changed, and we are able to tighten up both the VOR and the TACAN cone.

Mr. PLAPINGER. In a paper issued by the Air Coordinating Committee and published by the Department of Commerce in 1957, they still

refer to this 110° cone. However, I think it can be compensated for if you erect a tower of some 100 or 110 feet.

I do not know how expensive this starts to become, erecting 100-foot towers all over the country.

Mr. TIPPETS. We are not doing it that way; no, sir. The TACAN cone is broader than the VOR cone. Whether it will ever have exactly the same dimensions, I do not know. But with the distance information which measures from the zero point of the cone, this will be be a more reliable reference as to how near you are over the station than will the cone anyway, so the use of TACAN cone will not be an insurmountable problem.

I think we should bear in mind, too, we are not planning at this time, at least for the civil carriers and airplanes, to use the TACAN bearing. They are going to use the VOR bearing here and worldwide.

Mr. PLAPINGER. All the commercial carriers are now equipped with VOR?

Mr. TIPPETS. Yes, sir.

Mrs. GRIFFITHS. You are not planning to use TACAN?

Mr. TIPPETS. Not TACAN bearing; but we will use TACAN distance. I hate to take up all the time, but I know you are very interested in this question.

One question raised in the material requested of us was the status VOR/DME internationally, and we want to report to you that there is presently scheduled, a meeting next February, in the IACO organization, which is a subgroup of the United Nations, where short distance aids will be discussed, and specifically at that time the United States will hope to describe its domestic system and its relationship to the world. We are hopeful that we will be able to have adopted internationally the TACAN-type distance equipment wherever this equipment is used worldwide.

This is something we cannot say we have done yet—not until we actually have this meeting next February and March.

We are working now on documentation for this worldwide meeting, which will involve this subject. The United States is having a technical symposium in Washington and at Indianapolis in October. We are inviting our world friends that are involved in the IACO community, in an effort to explain to them what the United States VORTAC system is, its relation to worldwide navigation and control, and why the United States is proposing adoption of TACAN-type distance information worldwide. We hope to solicit their understanding, and hope they will adopt this.

The VOR is not in jeopardy at this time. It has been ruled that the VOR will continue as an international short-distance standard until at least January 1, 1966. This is a fairly long protection date, and may even be extended, depending on where the state of the art takes us in short-distance aids.

We have to bear in mind this is a very dynamic field. There are improvements every day, and somebody is inventing something new almost every day.

We just cannot buy every new system that comes up. We have to use what we have as long as it is technically possible to do so in order that the users can get their money out of what they have.

This is a tremendously fluid field. There is something new almost every week in the technical trade journals about improvements or devices somebody is coming up with. We are constantly faced with an evaluation of where we stand. We work closely with industry and airborne users, and we come out with a pretty sound program every time.

I think we have done remarkably well in holding our own in a very dynamic and fluid field on a worldwide basis.

Mrs. GRIFFITHS. Is the meeting necessary internationally to secure acceptance of TACAN, because international DME has been accepted and agreed upon?

Mr. TIPPETS. I do not believe I understood your question.

Mrs. GRIFFITHS. You are having an international meeting to suggest the use of TACAN; is that right?

Mr. TIPPETS. No; the international meeting is on short-distance aids and traffic control, and one item on the agenda will be what to do about VOR and DME—not TACAN. We are not proposing TACAN as a civil device worldwide. We are proposing VOR bearing and TACAN distance.

The military have agreements with the foreign military groups for TACAN bearing and TACAN distance. We are proposing continuation of VOR bearing and adoption of TACAN-type distance for worldwide use, not VORTAC, which is VOR with full TACAN.

We are not proposing VORTAC worldwide, and for quite obvious reasons, the TACAN bearing is a military need domestically as well as overseas. We only propose the civil part of VORTAC, which is VOR bearing and TACAN distance.

Mrs. GRIFFITHS. But you had that international agreement?

Mr. TIPPETS. We had it on VOR, and a DME, of the 1,000 megacycle type (not compatible with TACAN), but no one ever implemented it except the United States. One reason was the evolution of a number of kinds of systems around the world, including TACAN.

There is a British system, and other systems being proposed that would provide distance information of a kind. Distance information is one of the items to be resolved next February.

In the United States we have VORTAC. TACAN is a military requirement here; it is a military requirement at sea; it is a military requirement overseas. The domestic United States is going to have VORTAC, notwithstanding what they might adopt at the February meeting.

We hope to reach an understanding on a cooperative basis, and we hope to prevail upon our ICAO friends to understand and accept the TACAN distance as an international standard.

We will not know until after next March how we make out.

Mrs. GRIFFITHS. But DME was never implemented because immediately after the agreement was made, the Navy began searching for something they considered better, and they considered TACAN better.

Mr. TIPPETS. I cannot say that was the only reason. I think other countries had their own ideas about how to get distance information, too. This is probably part of it, but there were other factors.

For example, the British had their ideas of what they wanted to do in 1949 and 1950.

There are other kinds of DME in use. There is the 200 megacycle DME the British have in some parts of the world for their comment

operations. It is the same approach to this problem in a different frequency band.

It is a complicated technical matter, and other countries have equal interest in what was adopted worldwide. They did not implement the United States type until the problems were resolved whether they wanted this or their own devices. We are still debating this issue and it will come up next February.

Mr. PLAPINGER. Mr. Tippets, you used the word "prevail" a number of times. This seemed to confirm our impression there were a number of international noses out of joint as a result of the VORTAC decision.

In a letter to the chairman of the Government Operations Committee, dated March 3, 1958, from the Aircraft Owners and Pilots Association, there is a quotation from a memorandum from Mr. Nelson David, United States representative at IACO in Montreal, to the Secretary of the Air Coordinating Committee. The memorandum is dated February 24, and says in part——

Mr. MEADER. February 24, 1958?

Mr. PLAPINGER. 1958.

It says that—

> although during United States preparation for the meeting in Montreal of the Sixth Session Communications Division of IACO, it was pointed out that TACAN had been adopted as a NATO aid and we could expect support from the NATO countries, it turned out at the meeting that not only did most of the NATO countries not support us, but, as a matter of fact, voted against us.

And then, from the British magazine Flight and Aircraft Engineering, December 1957, there is a reference to the common system of the United States, saying that—

> this leaves incomplete VOR and VORTAC, neither of which can fulfill the short-range traffic-control requirements; that one point which emerges most forcefully is that both these systems are the result of the American common system concept, and that in this unhappy military-civil partnership, the shifting and changing tactical requirements of the five United States military services are riding roughshod over the world airlanes; that any real progress seems unlikely until the common system is abandoned.

This may be just for domestic consumption, but it is interesting to note that the British, apparently, are not entirely enchanted with our decision.

Mr. TIPPETS. That is what I was explaining to Mrs. Griffiths; yes.

There is no doubt that these are questions that need to be resolved on a technical level.

I did not mention that at the IACO meeting last year we did propose a standard specification covering the distance portion of TACAN. The vote was pretty evenly divided, and as a result the meeting said, "Let us hold a meeting on a number of subjects, including this one, before we rule on it." That is the reason we are presenting again for the February meeting this question of international standardization of a TACAN compatible DME.

Mr. PLAPINGER. Do you think DME would have had such difficulties of acceptance?

Mr. TIPPETS. Quite probably, we cannot say to what extent because back in 1952 and 1953, as I mentioned, the British were implementing 200- and 400-megacycle, single- and double-pulse equipment, and were anxious for that. I cannot speak for this NATO implication that is

in your note, because I assume that some of the NATO relationships are of a military nature, and I am not an authority on that.

There is, obviously, a problem here that bears on the United States common-system concept that we must have in this country to make efficient use of the airspace. We must have some common airlanes so people know where they are and where they are going.

We have a volume of traffic in the United States they do not have in Britain. Yet, around London and some such places they have comparable terminal problems.

I do not mean to say this in a derogatory way, but I think we are further advanced in how we have to use airspace because of the tremendous Air Force and Navy airpower in this country and its necessary relation to civil aviation.

Their criticism is that they do not see any need for a common system, so called. We have to have a common system. If we had two separate systems, you could get fewer aircraft efficiently into the airspace than on a common system where common tracks are used on certain kinds of airways or air routes or terminals.

These criticisms by other countries require a great deal of cooperative deliberation and technical thought and, as I say again, we are hoping that they will understand why we do the things the way we do. Maybe we can be very helpful to the world in this.

I say this in the spirit of ICAO relationship. We want to be helpful to others. We hope to take advantage of their experiences, which will be helpful to us. We want such things adopted as will be good for international aviation.

Mr. PLAPINGER. Has any thought been given to abandoning the common-system concept?

Mr. TIPPETS. Not so far as I know; no, sir.

Mr. PLAPINGER. When you have self-contained systems, what happens to the common system?

Mr. TIPPETS. The airlane system and traffic-control system is the common system; one agency has to keep track of everybody in the airspace. One outfit has to keep the airplanes separated. It is in that sense we talk of "common."

Mr. PLAPINGER. I thought you were talking about equipment.

Mr. TIPPETS. Both, but we are talking about——

Mr. PLAPINGER. You were talking about tracks before.

Mr. TIPPETS. The same thing would prevail. You narrow down the tracks. When you are approaching the terminal, someone has to be sure the tracks are common or the tracks are kept separate.

Mr. PLAPINGER. You are not concerned with VORTAC or DME, but a reliable, accurate, easily maintainable azimuth distance-measuring equipment; is that not so?

Mr. TIPPETS. The way you asked the question, it is hard to answer. We are concerned with VORTAC.

Mr. PLAPINGER. I mean as an end.

Mr. TIPPETS. In the end, we are concerned with the most efficient and safe use of the airspace by all users.

Mr. PLAPINGER. But as far as the equipment needed to arrive at that optimum?

Mr. TIPPETS. We are using a system with the ground environment which is, at the moment, the best way we have to get bearing and distance information; yes, sir.

Mr. PLAPINGER. Let me ask you something, Mr. Tippets. You mentioned before it would take $300 million to install the VORTAC system.

Mr. TIPPETS. Yes, sir.

Mr. PLAPINGER. What would be the comparable cost for VOR/DME? What would that cost have been if VOR/DME had been designated as the common system?

Mr. TIPPETS. I can mentally calculate it. Let me say this; that we paid $10 million for the 450 units of the ground DME that we purchased. This was only about a third of the system we are now talking about, and, also, today the prices will have gone up substantially.

It is difficult to say what a comparable figure would have been in today's market. It would have been a much greater figure than we had previously thought in 1949 or 1950, but it would not have been as great as the $305 million. It would have been much less.

Mr. PLAPINGER. It would have been less than the $300 million you are spending?

Mr. TIPPETS. It may have been $200 million or $250 million; I do not have comparable figures.

Mr. PLAPINGER. Of course, the prices for VORTAC are going to go up.

Mr. TIPPETS. Yes. It is hard to give you a comparable figure. I do not think we know. When you go to buy 800 former civil DME's, the difference is we are getting bearing and distance on the TACAN, and not both on the DME; so, they are not comparable equipments.

Mr. MEADER. Just a minute. Let me see if I understand it. You said that 450 DME units cost $10 million——

Mr. TIPPETS. Yes.

Mr. MEADER. And that was about one-third of the system; so you needed 800 or 900 more.

Mr. TIPPETS. Yes, sir.

Mr. MEADER. If they cost the same $10 million, that would be $20 million more if you double the cost, because prices have gone up, so you would only have $40 million. But you talked about $200 million.

Mr. TIPPETS. Mr. Meader, when you do that, you forget about the fact the military would have had to have bought a separate bearing system that may have made this cost to the United States even greater. That is why it is so hard to get an exact, comparable system.

When we went into the VORTAC system, we embarked on purchasing for a military tactical need and a civil need. By putting them in the same building, locating them on the same routes, we saved some money and airspace that would have been required if we had had separate systems on separate routes, if you see what I mean.

It is a difficult thing to weigh this on a fair basis to the VORTAC, for that reason. Because we would have had separate military TACAN's with bearing and distance, and VOR's with the distance measuring on civil routes, separately located at additional cost for sites, roads, power, and all the features that go with the separation.

The virtue in the compromise was really being able to install them in the same building at the same site, and take advantage of all the attendant efficiencies that have come from that.

I am begging the question, to be real honest, because I do not know what a real, true, comparable figure would have been. It would have been considerably less than $300 million, as far as CAA only would

have been concerned, but what it would have been totally to the United States if the military had gone separately—it could possibly have been more than $300 million; in all fairness, I do not know.

Mrs. GRIFFITHS. This imposes a greater need of accuracy, when it really got down to the point of landing ships on a carrier.

Mr. TIPPETS. This was one of the primary technical items. As you will recall, Mrs. Griffiths, at one time there were 5 or 6 points, including mobility and use on shipboard. Ship use was always a primary consideration, and still is, as far as the military is concerned.

Mrs. GRIFFITHS. So they will be able to land planes just as commercial carriers land in airports, with the piece of equipment the civilian people could use.

Mr. TIPPETS. Yes, ma'am. As a matter of fact, they have instrument landing systems and devices that are comparable.

Mrs. GRIFFITHS. So really, I personally agree with what Mr. Cannon has said, that carriers are ridiculous and totally unnecessary, and the military has been willing to jeopardize the lives of all civilian users of the air in order for them to experiment with a piece of equipment which is, in my judgment, highly questionable.

As a matter of fact, did they not secure an order, either in 1955 or 1956, that would have cleared the air of all the DME equipment so they could have experimented with TACAN?

They did, did they not? It was supposed to go into effect either June 30 of 1955, or June 30 of 1956. And because there was tremendous international repercussion, we finally got rid of the order.

They were going to have 5 years in which to experiment with this piece of equipment that was not worth anything at that time. All they had been doing was spending money.

Mr. TIPPETS. I am sure you realize you are referring to documents and language that I am not familiar with, Mrs. Griffiths.

Mrs. GRIFFITHS. I think if you will check back, you will find that they had secured an order to clear the air of the use of DME for 5 years, and to permit them to use TACAN, to experiment with TACAN.

Now that order was rescinded.

Mr. MEADER. Are you familiar with such orders, Mr. Tippets?

Mr. TIPPETS. I am not.

Mrs. GRIFFITHS. Trevor Gardner came up and explained it to us.

Mr. TIPPETS. We have 256 DME's. We are using them intensively in our flight-check operations, and these will continue until such time as there are enough TACAN's in to take care of the need, which will be some years away, following 1961, 1962, maybe as late as 1963. So there will have been some years' use of the existing ground equipments which are installed.

Mr. PLAPINGER. Mr. Tippets, we have also been told that the B–52's and KC–135's have self-contained units, plus VOR, and are not even using TACAN now.

Mr. TIPPETS. I am sure this is true, but if you inquire of the Navy and Air Force, you will find a great many tactical aircraft being equipped with TACAN only, and they have a program in the delivery of 29,000 units. Some of the earlier models—they are going to great expense and great urgency to have them fitted with new refinements. There is a big program in the military on this.

Their statement to you will be as it has been to us, I am sure, that their needs for TACAN continue to be very urgent.

Mr. PLAPINGER. I am interested in this because when General Bergquist appeared before us in 1956 he told us this equipment was completely reliable then, and if it was so reliable, I can not understand why the equipment has not been placed in the Air Force's own planes two years after.

Mr. TIPPETS. They have some 20,000 already delivered of the 29,000, and, of course, they are up against this sort of situation, Mr. Plapinger. There are not a lot of domestic ground stations in yet. We are putting them in just as fast as we can, and they will use them as fast as they can be put in.

The Navy is making extensive use of this in some fleet operations, and I presume in some overseas military arrangements I am not familiar with.

In response to Mrs. Griffiths' question, there are MATS airplanes and certain other military airplanes that will always have VOR in addition to everything else, so they can operate in any environment that they come into. But there are some tactical aircraft at the moment that will only have TACAN.

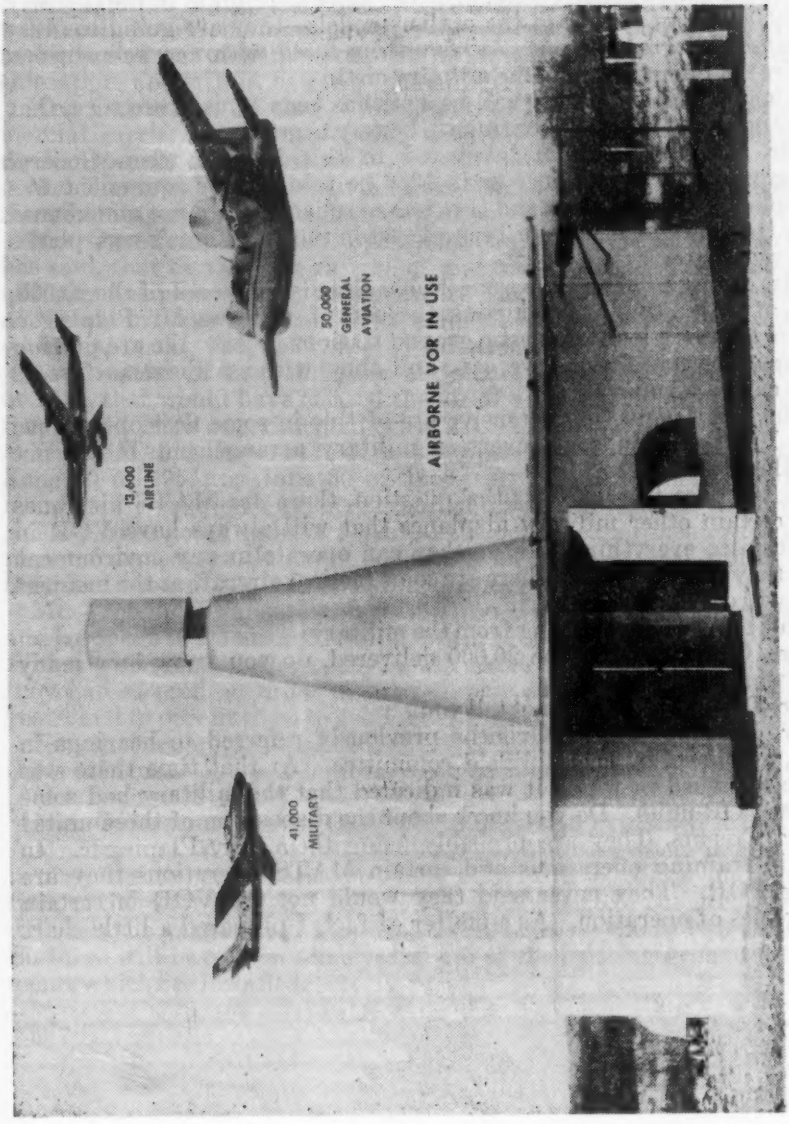
This is my understanding from the military.

Mrs. GRIFFITHS. Of the 20,000 delivered, do you know how many are installed?

Mr. TIPPETS. No, I cannot tell you.

Mr. PLAPINGER. Mrs. Griffiths previously referred to hearings in 1955, I believe, by the Holifield committee. At that time there was a report issued in which it was indicated that the military had some 26,000 VOR units. Do you know about the disposition of those units?

Mr. TIPPETS. They are probably using them, Mr. Plapinger. In certain training operations and certain MATS operations they are using VOR. They never said they would not use VOR in certain categories of operation. As a matter of fact, I prepared a little chart


AIRBORNE VOR IN USE
13,600
AIRLINE
50,000
GENERAL
AVIATION
41,000
MILITARY

for you. This [pointing] is a typical VORTAC installation, to show you actually what has happened here in a very real sense. This is the Phillipsburg installation. This shows you that the air lines now have 13,600 VOR's installed, general aviation have some 50,000, and military has some 41,000 VOR's installed. This is the Phillipsburg VORTAC installation. I just translated this from the schematic to the actual situation.

Mr. PLAPINGER. And is this the only one in present operation?

Mr. TIPPETS. No, we have 27 others. They are in operation. They lack only the monitoring equipment not yet delivered. There are 27 and others are going in every week.

I want to leave the impression that we are making real progress on implementing the ACC decision, which was the best decision that could be made in the total national interest at the time. We are moving forward with great vigor, partially because of support this group gave us in 1956. As you remember, we came here and you urged us to telescope our plan. We did so and have been given additional appropriations.

Mr. PLAPINGER. What would be a matter of concern to the committee would be the fact that in 1956 when this decision was made there was in being an operational system that would have been further implemented two years later, today; whereas now with VORTAC you have the Phillipsburg station, plus three or four—I am sorry, did you say 27?

Mr. TIPPETS. The military have a number of bases with TACAN's in operation, too.

Mr. PLAPINGER. The civil equipment is not in being although on order. I hope that we have not "bought" a $2 billion turkey.

Mr. TIPPETS. Let me just say this. When the decision was made, rather than delay the implementation we agreed to accept certain military equipments that were on order or could be put on order by the military.

Mr. PLAPINGER. This is not directed in criticism of CAA. I am thinking out loud probably in terms of the VORTAC decision as against a decision for DME.

Mr. TIPPETS. My statement was not intended to be contentious. I just wanted to say that recognizing what you say as a delay possibility, we are accepting military beacons in the first phase so as not to slow down the implementation. These equipments are being delivered to us today.

Mr. PLAPINGER. We were talking about the need or the requirement for distance measuring equipment during our hearings in 1956, and Mr. Rothschild testified before us to this effect:

We, Mr. Lowen and General Curtis and myself and several of the staff, met with the operating heads of all the airlines in Colorado Springs about the 1st of May—

I may interpolate and say our hearings were during the latter part of June and July, 1956. Continuing—

and they indicated at that time there was need for distance measuring service on the airways by the time that civil jets would be flying.

Now, I understand from you gentlemen today that there is not that need. Am I correct? Do I have a misimpression, Mr. Thomas?

Mr. THOMAS. Mr. Plapinger, I think there is probably a little difficulty on——

Mr. PLAPINGER. Terminology?

Mr. THOMAS. Terminology and use of words. Insofar as requirement, we were talking about a legal requirement, where the lack of equipment would prohibit an airplane from flying. Insofar as a requirement where someone would say, "I need this to operate," but not a legal requirement, I think you will find the air carriers are ordering the distance-measuring equipment for jet aircraft. I am sure ATA will be here later and testify. As a matter of fact, only within the last few days they have issued a press release which you may be familiar with, outlining their position. But in the sense of a legal requirement, there is no requirement, and our estimate of the date on which we would impose such a requirement is 1965.

Mr. PLAPINGER. Mr. Thomas, if there is a need for the equipment, why should not there be a legal requirement?

Mr. THOMAS. Mr. Plapinger, the theory on which we operate insofar as legal requirements are concerned is on the basis of minimums of every category. Anything that we specify which imposes a burden is the minimum necessary for safe operation. At the moment we think that the jets, the civil jets, can navigate without distance measuring equipment. In fact, the military jets have been demonstrating it for 15 years. But when we get a greater concentration of traffic that is coming up and the requirement for narrower lanes to operate within, and the need for handling more traffic, then to do so will require better navigation equipment than is contained in the aircraft today.

Mr. PLAPINGER. What you are saying is there is no need now. If you say there is no requirement because of lack of equipment, that is something I can understand, but you are not saying that. You are saying there is no need.

Mr. THOMAS. I am saying there is not such need that the CAA feels that it cares to recommend a legal requirement for it.

Mrs. GRIFFITHS. If you had distance measuring equipment on these planes, you could stop the crashes; right?

Mr. THOMAS. Mrs. Griffiths, to be effective in the air traffic control system, essentially all the aircraft within the system would have to be capable of performing the same maneuvers, that is, have the same equipment. If there was one jet equipped or a few jets equipped and the others were not, then our rules would have to be based on the least adequately equipped so far as separation standards are concerned.

Mrs. GRIFFITHS. Why do you not establish some rules that require them to be equipped? That is what we are asking, require them to be equipped and use the equipment and stop the crashes.

Mr. THOMAS. Mrs. Griffiths, I do not believe that that in itself would do it.

Mrs. GRIFFITHS. It would go a long ways, would it not?

Mr. THOMAS. It would go a long ways in providing more adequate knowledge of where the particular aircraft are, but the major problem now is the number of people and the number of ground facilities and equipments in order to keep up with all the aircraft.

Mrs. GRIFFITHS. There was a distance measuring equipment station within 25 miles of that crash out in Colorado, right? If both of those planes had been equipped with DME, it would not have occurred, the crash in Colorado that killed about 143 people.

Mr. THOMAS. The Grand Canyon.

Mrs. GRIFFITHS. There was a distance-measuring equipment station within about 25 miles of that crash, was there not? If both of those planes had been equipped with DME, you would have had a very good chance that that crash would never have occurred, right?

Mr. THOMAS. This occurred, of course, in uncontrolled airspace, and there is only an assumption that having the equipment, having the controlled airspace, having the controllers and the requirement for the procedures—I mean there is a lot of other things that would have to be added as well as distance measuring equipment. That would be one element only.

Mrs. GRIFFITHS. But it would have been done. One of the reasons that it has not been done is because the military has been dragging its feet for 12 years. They have been opposing any kind of equipment for commercial carriers, so that they could have what they considered their requirement.

Mr. THOMAS. Mrs. Griffiths, the only point I was trying to make is that the improvement in traffic control requires a great deal more than distance information. It requires radar, people, and a lot more fundamental things, in my opinion, than just distance measuring equipment, although this is certainly one element.

Mrs. GRIFFITHS. That is one of the major requirements.

Mr. THOMAS. This is one of the elements.

Mrs. GRIFFITHS. And the very topflight pilots will tell you that if they had had those installations then some of these crashes would not have occurred. You can wipe them out with this equipment if you will require it. Now, I am for you people. I am for you establishing some rules and enforcing them.

Mr. BOYLE. I think what Mr. Thomas is saying is that we are in favor of DME, too.

Mrs. GRIFFITHS. But you have the authority to require them.

Mr. BOYLE. What he is saying is that the problem is not simple, that merely putting DME on the aircraft will not keep those two aircraft apart. They know where they are. Each one knows where it is. It does not know where the other is unless somebody tells them. Now, this means communication. You have to have——

Mrs. GRIFFITHS. The ground installation and the pilots.

Mr. BOYLE. The controller must talk back to the other pilot. This is one of the real problems that we are faced with at this time. It is the just fundametally lack of the additional communication ability that we need. This is just one of the problems that is involved in this whole package, and I did not want to have the problem too simplified in its presentation.

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Mr. PLAPINGER. There are reporting requirements, are there not, Mr. Boyle, when you have this equipment? You report in every so often?

Mr. BOYLE. It depends on the rules under which you are operating. If you are operating under instrument flight rules, there are specified reporting requirements. The aircraft operating under instrument flight rules are separated from each other by our traffic controllers. We use this communication ability for assuring that separation. The problem is that our communication ability is at the moment still limited.

Mr. PLAPINGER. Because you do not have the equipment?

Mr. BOYLE. This is correct.

Mr. PLAPINGER. If you had the equipment you could establish the rules; is that not right?

Mr. BOYLE. This is exactly where our Federal airway plan is taking us, as rapidly as we can get there.

Mr. BLATNIK. Mr. Pyle, we appreciate your coming over. We know the conflict in the schedule and the pressure on you at the other hearing.

Mr. PYLE. I am sorry I could not be here at the outset, Mr. Chairman.

Mr. BLATNIK. We understand that.

Mr. MEADER. I would like to tell Mr. Pyle we have not gotten beyond page 3 of his statement yet.

Mr. BLATNIK. We are honored and pleased to have with us the Under Secretary of Commerce for Transportation, Hon. Louis Rothschild. Welcome, and thank you for stopping by.

Mr. Boyle, do you want a moment or two to compare notes?

Mr. BOYLE. It would be helpful if we could.

Mr. PYLE. Mr. Chairman, if it is in order I will read through page 2 and cover some of these things, even though there may be slight repetition, in order to make the record complete.

On June 30, 1958, CAA had completed 27 VORTAC's, and at the present rate of equipment deliveries there will be 258 VORTAC's in operation, as recommended, on June 30, 1959. The remainder of the 346 VORTAC's will be ready by June 30, 1960.

The CAA will implement 213 additional VORTAC's with the funds made available by Congress for fiscal year 1959. The total number of VORTAC's which will be required by 1965 is estimated at 1,209, as shown in the CAA's Federal airway plan for the fiscal years 1959-63. Revised master location lists prepared by civil and military agencies are now being correlated, and as a result the total number of VORTAC's may be changed when the 1960-64 edition of the plan is prepared. The civil and military requirements have been very throughly coordinated from the outset in order to keep the total number of facilities at a minimum.

The 1956 VORTAC recommendation called for distance-measuring capability at 70 ILS, or instrument landing system, facilities by July 1960. The ACC, after considering the more urgent need for VORTAC, agreed that funding of this program could be deferred for 2 years, and present plans call for funding of distance-measuring equipment to be added to 245 instrument landing systems during the fiscal years 1961–63.

The CAA is now developing a production specification for TACAN compatible ground DME, or distance-measuring equipment, for use where the full TACAN with both bearing and distance may not be required.

With respect to progress in the area of airborne VORTAC equipment, the airlines and industry have developed the necessary new distance-measuring equipment (DMET), and an increasing number of orders are being placed with manufacturers. One manufacturer has developed airborne DMET for use by general aviation, and as the ground system approaches completion the demand for airborne equipment for general aviation should increase its availability. The committee should know that the International Civil Aviation Organization has called a special worldwide meeting on air navigation and air traffic control to convene in Montreal during the month of February 1959. The agenda for this meeting contains many items of extreme importance to world standards in the aviation field. One of the most important items to be discussed on this agenda will be the consideration of standardized distance-measuring equipment.

Mr. MEADER. Mr. Chairman, I would like to ask Mr. Pyle how much one of these units is going to cost.

Mr. PYLE. Mr. Tippets, do you have that here?

Mr. TIPPETS. Which device?

Mr. MEADER. I am talking about the airborne equipment.

Mr. BLATNIK. The DME.

Mr. TIPPETS. The air carrier's version will run between five and six thousand dollars a unit. The low-cost version, probably after there is enough demand, will be something near a thousand dollars installed, with its maintenance contract, but at the moment they are only building an air-carrier type. They do have in prototype the so-called general aviation or a less expensive version of the other.

Mr. MEADER. That is just the distance-measuring part of it. What will the VOR part cost?

Mr. TIPPETS. It runs about $5,000 each for an airline version, with its indicators and power supplies.

Mr. MEADER. About the same for each?

Mr. TIPPETS. Approximately, I think; yes, sir.

Mr. MEADER. In other words, for business aircraft equipped with this equipment it will cost at least $2,000?

Mr. TIPPETS. In the business aircraft?

Mr. MEADER. Yes.

Mr. TIPPETS. Yes, sir, I think so, and this of course usually includes the installation cost, and most of the distributors incorporate a maintenance clause which gives them maintenance for the life of the equipment.

Mr. PLAPINGER. The business planes are the ones that now have civil DME?

Mr. TIPPETS. Yes, sir; that is correct.

Mr. PYLE. There are relatively few of those.

Mr. PLAPINGER. How many are there?

Mr. TIPPETS. Most of the business airplanes have the airline version of VOR. They have the expensive or the more sophisticated units, too. I think general aviation has about four or five hundred airborne DME's.

Mr. MEADER. You had another chart that showed the airlines had 1,500.

Mr. TIPPETS. These were VOR's we were speaking of.

Mr. PLAPINGER. Why the reluctance on the part of the airlines to put in civil DME?

Mr. TIPPETS. The transition—of course, the status of DME has been published since 1956, and there would be no reason to buy it and quickly phase it out. Before that time they were waiting for a firm decision as to what the United States common system device would be. They delayed until the issue was settled.

Mr. PLAPINGER. When are you going to phase out the DME?

Mr. TIPPETS. The 260 that we now have in operation will be in operation just as long as it is necessary, until a sufficient number of TACAN's are available to take their place. It will probably be 1961 or 1962 before they are all shut down, or even longer. We are using them for two purposes, Mr. Plapinger, as I explained. General aviation is using them for navigation, and we are using them for flight inspection work. Our own airplanes are using them to check the accuracy of our facilities on a nationwide basis.

Mr. PLAPINGER. Are you using them to check the accuracy of the TACAN equipment and VORTAC equipment also?

Mr. TIPPETS. We are using them to pinpoint our position in space, to check accuracy of all devices, low frequency range, TACAN, VOR, or any device. When there are enough TACAN's to take their place we will begin to shut DME down and do the same thing with TACAN type DME.

Mr. PLAPINGER. So that if the airlines had put in civil DME they would have at least 5 or 6 years of use out of DME?

Mr. TIPPETS. I think that is a fair statement; yes, sir.

Mr. PYLE. I think it is also important to point out, Mr. Chairman, that their use would have been restricted, because of the relatively few stations that were in operation; only 260. There are some 600 VOR's in operation, so they were going to get maybe 40 percent of the coverage that they would need. This is another [reason] for them not to do it.

Mr. PLAPINGER. Except that the equipment was in being, and presumably CAA could have ordered it and was about to order it, and had DME to install, when the VORTAC decision was made.

Mr. PYLE. This is correct.

Mr. PLAPINGER. Just one further interruption. We wrote Mr. Pyle in December and asked for accuracy and reliability data concerning the operation of the VORTAC installation, and at that time you said:

> We are conducting extensive tests from which we will be able to make definite determinations regarding such comparative reliability. For your information, our program calls for the establishment of approximately 100 VORTAC's during calendar year 1956, and as this installation progresses we will be able to accumulate data more rapidly.

I wonder what stage of accumulation of data you have arrived at at this point, and whether you could make available to the subcommittee reliability, accuracy, and maintenance data on the VORTAC installations, and possibly comparative data with respect to VORTAC–DME.

Mr. PYLE. I would like to answer that first by stating that, as set forth in the statement, we have only 27 TACAN stations right now

in actual operation, so we are not in a position to give you too accurate or conclusive data. I would ask Mr. Tippets though to give a rough guess as to how we are coming on that particular point.

Mr. TIPPETS. Mr. Pyle, before you came I spoke to this to some extent in response to a similar question from Mrs. Griffiths. The reliability of a system, of course, comes with experience after you have enough of a system to know more about it. Let me say except for the TACAN cone, which is broader, as we discussed earlier, broader than a VOR cone, the accuracies of TACAN are comparable to the VOR/DME. This is not only theoretically so but also demonstrated in flight checks that we have taken. In the accuracy area I think that there is data to support this both from the military point of view and our point of view and from a pilot's point of view. On the reliability factor, I think we would want to be real candid. There have been problems in some of the earlier military versions of TACAN. The military, however, have improved their specifications every year. Their newest equipment takes into account all of the deficiencies they could recognize in the earlier models. We have improved upon the military specification, and as in the case of any new equipment, VOR, DME, or low-frequency ranges or whatever it may be, we are constantly designing improvements that we see are needed, based on experience.

We do not anticipate any real reliability problem with this equipment. As far as accuracy is concerned, they are quite comparable. As I say, the cone is a difference. That is one that is real and easy to recognize, but in the accuracy area, whether you are a degree or half a degree or two and a half degrees within a tolerance, it is comparable in either system, and this, I think, has been borne out by data earlier given you. But we would be glad to provide you what might make a story on this for you, Mr. Plapinger. However, I would like the record to show that we are not fearful of the reliability problem. We are in business to improve and design for reliability, and that is what we will do.

Mr. MEADER. May I suggest that Mr. Tippets has now covered down to item 3 on page 4.

Mr. PLAPINGER. Incidentally, we have another day for CAA. They are coming in tomorrow.

Mr. MEADER. He has just expanded on paragraph 2, the reliability of the VORTAC equipment.

Mr. PYLE. I would like to mention, Mr. Chairman, that we are working diligently on preparation for this meeting that I mentioned before, the ICAO meeting, and one of the activities in this connection will be a symposium to be held in this country in early October to demonstrate the use of the United States VORTAC system. In this way we feel that our friends in other countries who are members of ICAO will have a better understanding of the United States VORTAC program. This symposium will be an extremely interesting and informative activity, and I would sincerely hope the staff and members of the committee attend this symposium and see how this system works.

Mr. PLAPINGER. Where will this be?

Mr. PYLE. It will be here in Washington and also in Indianapolis.

I would like to point out for the record at this time, Mr. Chairman, that we are very anxious that the members of the committee and the staff come down any time to any of our facilities. We can arrange tours to Indianapolis and Oklahoma City. We feel it is important that this committee know what we are doing with firsthand knowledge, to see the facilities and see what our men are doing, men and women, who are doing an excellent job. You will appreciate it when you have firsthand knowledge. We can do it right here in Washington, where we have an approach-control facility and a traffic-control center, with perhaps a little flight in an airplane to show the other side of it; what happens from the pilot's standpoint. We would be very appreciative if the members of this committee and the staff would do this with us. I think some of the members of the staff have already done so.

Mr. MEADER. Mr. Pyle, you have not forgotten Mr. Minshall and I took a flight with you as the pilot.

Mr. PYLE. And lived through it.

Mr. PLAPINGER. In acknowledging Mr. Pyle's services on that flight, I told him that Mr. Meader, Mr. Minshall, and myself are living testimonals to his ability.

Mr. BLATNIK. We would be very interested, Mr. Pyle, in this symposium, if you inform us of the place and time. We would like to have as many of us as we can and the staff to be represented.

Mr. PLAPINGER. I would like to acknowledge for the record the great help that we have always received from the CAA and Mr. Pyle and all the members of his staff in connection with any matters that we discussed with them.

Mr. PYLE. Following Mr. Meader's suggestion, we might skip paragraph II and go right to III, the status of the airway modernization plan since the 1956 hearings.

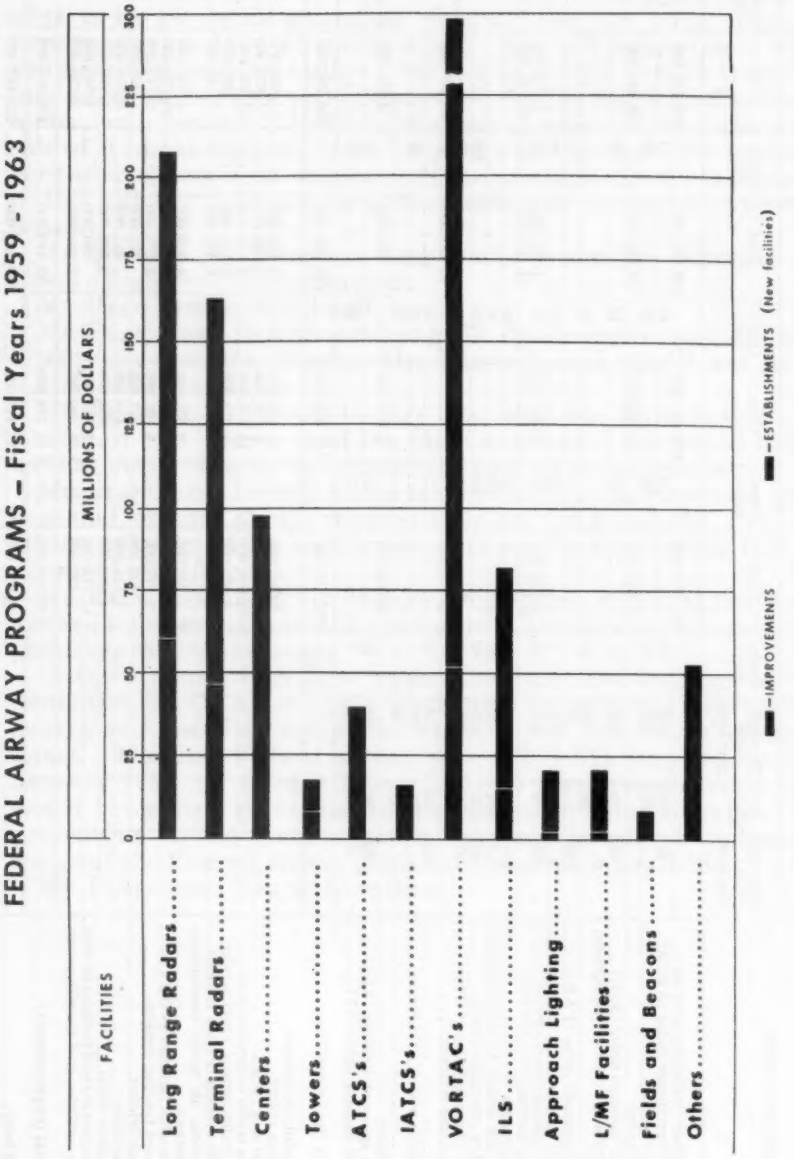
In the 2 years which have passed since the 1956 hearings of this committee, the CAA has highly accelerated its programs and has been buying and installing equipment which is just now becoming operational. The first Federal airway plan (1957–61) was presented in January 1956. A third edition (1959–63) was presented this year, and it is on these plans that the subsequent funding of capital improvements to the airway system has been based. I understand copies of the Federal airway plans have been made available.

Mr. PLAPINGER. Yes, we have those.

Federal airway plan—Establishment of air navigation facilities, implementation schedule for fiscal years 1959–63

Facilities or services	Total quantities			Fiscal year 1959		Fiscal year 1960		Fiscal year 1961		Fiscal year 1962		Fiscal year 1963	
	Through fiscal year 1958	In plan	Through fiscal year 1963	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost	Quantity	Cost
1. Long-range radars (including joint use)					$28,835,000		$56,450,000		$38,000,000		$23,750,000		
Air route surveillance radar (ARSR)	40	60	100	16		18		16		10		(1)	
ATC radar beacon		100	100	43		31		16		10		(1)	
2. Terminal area radar					17,545,000		24,280,000		25,060,000		26,640,000		$23,560,000
Airport surveillance radar (ASR)	62	76	138	19		17		12		16		12	
Airport surface detection equipment (ASDE)		30	30	10				10				10	
Precision approach radar (PAR)	23		23										
ATC radar beacon		189	189	5		50		50		49		35	
4. Airport traffic control tower service	224	69	293	23	2,579,000	16	2,200,000	10	1,600,000	10	1,700,000	10	1,800,000
7. Air navigation facilities (VORTAC)					50,816,000		53,191,000		54,582,000		39,740,000		48,850,000
VHF omniranges (VOR)	634	43	677	13		10		10				10	
Backfit VOR with TACAN rho/theta	299	337	636	150		100		67				20	
VORTAC's (theta/rho/theta)	47	526	573	62		100		120		120		124	
VOR test signal facilities (VOT)	31	79	110	33		26				20			
8. Instrument landing systems					3,675,000				16,420,000		10,750,000		36,225,000
ILS only	195	40	235	19				11				10	
Backfit ILS's with TACAN rho		225	225					50		50		125	
ILSTAC		20	20					10				10	
9. Approach lighting					9,002,000		5,575,000		420,000		3,180,000		500,000
Standard approach lighting (ALS)	89	146	235	80		45				21			
Sequenced flashing lights (SFL)	36	47	83	7		10		10		10		10	
Subtotal (major facilities)					112,452,000		141,696,000		136,082,000		105,760,000		110,935,000
Other improvements to system:													
1. Long-range radars					6,049,000		18,824,000		18,816,000		15,820,000		675,000
2. Terminal area radars					4,119,000		8,524,000		12,666,000		13,877,000		7,375,000
3. Air route traffic control centers					11,029,000		15,231,000		19,178,000		39,952,000		12,183,000
4. Airport traffic control tower service					4,353,000		1,619,000		1,113,000		486,000		455,000
5. Air traffic communication stations					7,126,000		8,849,000		8,425,000		7,941,000		7,165,000
6. International air traffic communication stations					2,155,000		2,275,000		4,316,000		4,847,000		2,751,000
7. Air navigation facilities (VORTAC)					1,156,000		13,400,000		9,041,000		10,623,000		17,280,000
8. Instrument landing systems					3,271,000		4,701,000		2,273,000		2,719,000		2,080,000
9. Approach lighting					406,000		373,000		703,000		255,000		385,000
10. L/MF facilities					1,114,000		446,000		533,000		3,334,000		15,931,000
11. Intermediate fields					1,933,000		612,000		2,545,000		1,176,000		2,538,000
12. Flight inspection and logistics aircraft					11,714,000		8,855,000		980,000		4,643,000		3,000,000
13. Housing, utilities, and miscellaneous					8,123,000		6,040,000		2,851,000		3,730,000		3,117,000
Subtotal (improvements)					62,548,000		89,749,000		83,440,000		109,403,000		74,935,000
Grand total					175,000,000		231,445,000		219,522,000		215,163,000		185,870,000

[1] Additional radars may be needed to obtain the required coverage.


FEDERAL AIRWAY PROGRAMS – Fiscal Years 1959 - 1963
MILLIONS OF DOLLARS
0
25
50
75
100
125
150
175
200
225
300
FACILITIES
Long Range Radars
Terminal Radars
Centers
Towers
ATCS's
IATCS's
VORTAC's
ILS
Approach Lighting
L/MF Facilities
Fields and Beacons
Others
– IMPROVEMENTS
– ESTABLISHMENTS (New facilities)

Mr. PYLE. Specifically, Mr. Chairman, I think it is on page 56 where there is outlined the actual——

Mr. TIPPETS. In this edition it is 53.

Mr. PLAPINGER. Incidentally, in this edition you referred to 1,250 VORTAC facilities. In your statement you referred to 1,209.

Mr. TIPPETS. We usually refer to approximately 1,200, because as you can see for cost reasons as well as just facility reasons we hope to keep this at a minimum, but it still looks around 1,200. It will be plus or minus some small factor.

Mr. PYLE. The CAA is responsible for in-service improvements to the existing airway system and the Airway Modernization Board is responsible for the medium-term and long-term efforts to develop and test new equipment required for the system.

The Federal airway plans have increased in scope and total cost, as the continued increase in air traffic has required us to intensify our efforts to keep abreast of demand, but the underlying principles are the same. Increased capacity is being obtained in three broad areas: (1) Radar, which gives the traffic controller ability to see the position of the traffic under his control; (2) communications of greater speed and extent enable the controller to issue direct, instantaneous traffic control instructions to pilots; (3) navigational track guidance and distance-from-station information will enable pilots to conform to traffic control instructions and make better utilization of airspace in congested areas and in bad weather.

I think it might help the committee to appreciate the amount of traffic that we are handling, if perhaps, Mr. Harvey can explain quickly the two charts that we have which will give this information.

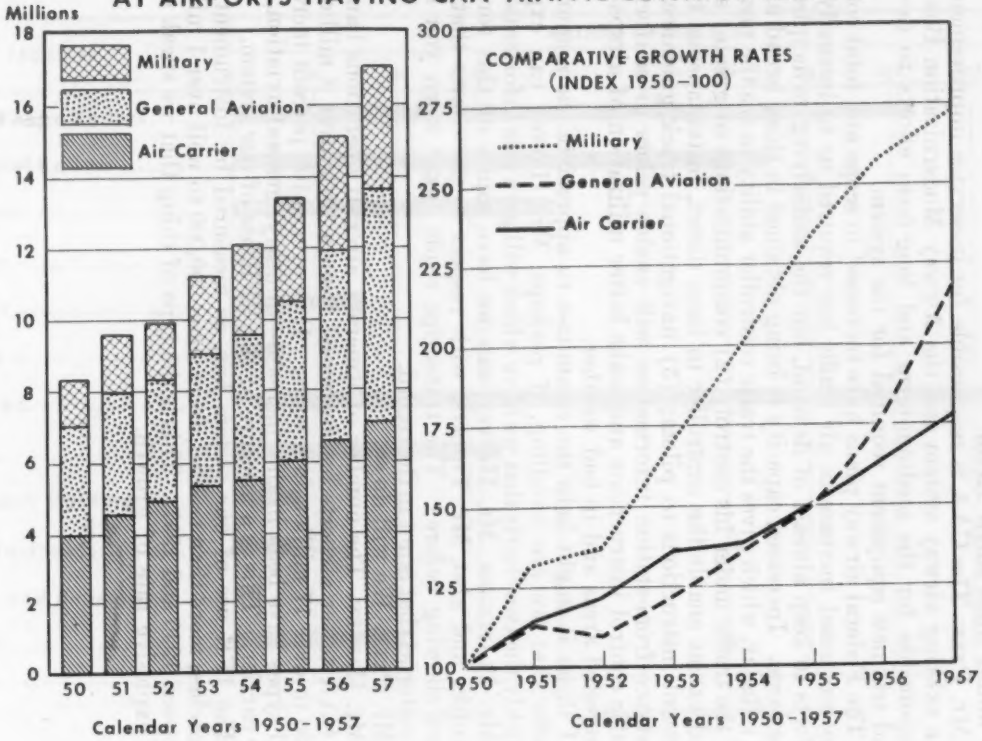
Mr. PLAPINGER. Mr. Harvey, can we have copies of this for our records, and also, Mr. Tippets, with respect to the charts that you were showing before? The transcript reads fuzzy when you refer to material that is not in the record.

Mr. PYLE. We will do so.

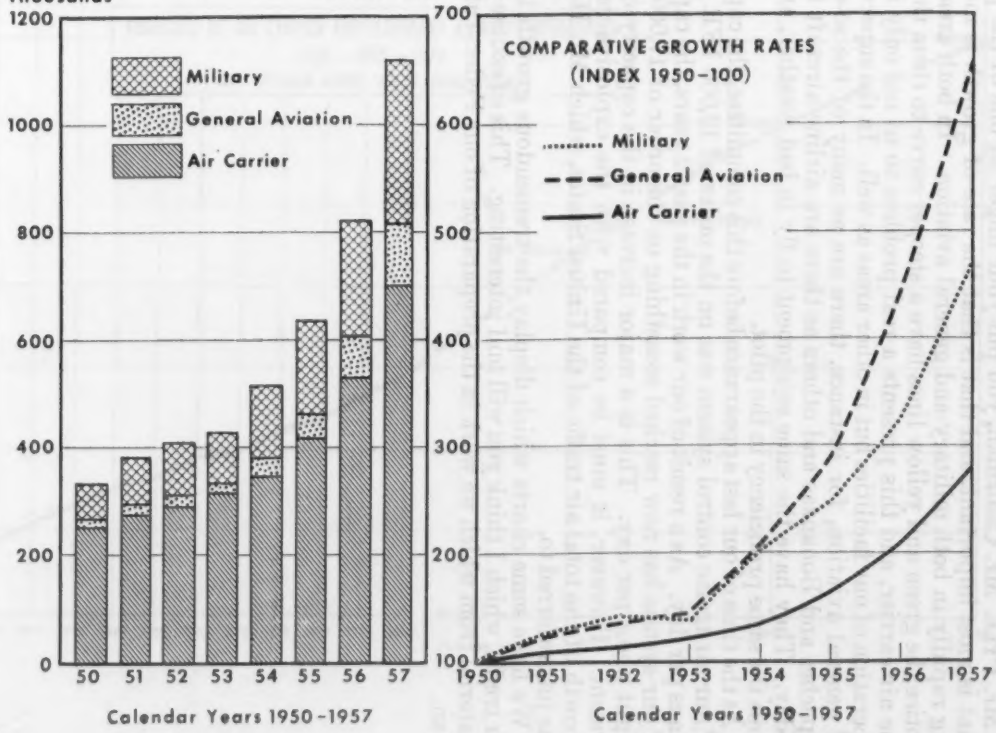
Mr. HARVEY. The number of itinerant aircraft operations handled at CAA tower airports has increased from a little over 8 million in 1950 to over 17 million in 8 years. It is over a 100 percent increase. All types have been in this increase—military, general aviation, and air carrier. This is a measure of the VFR use of our system.

The IFR use of our system has, as measured by instrument approaches, more than trebled, from some 300,000 to well over 1 million between 1950 and 1957. This is the type of thing that we speak of as an explosive rate of growth.

ITINERANT AIRCRAFT OPERATIONS AT AIRPORTS HAVING CAA TRAFFIC CONTROL SERVICE



INSTRUMENT APPROACHES HANDLED BY CAA AIR ROUTE TRAFFIC CONTROL CENTERS



Mr. BLATNIK. Most of that growth took place in your general aviation?

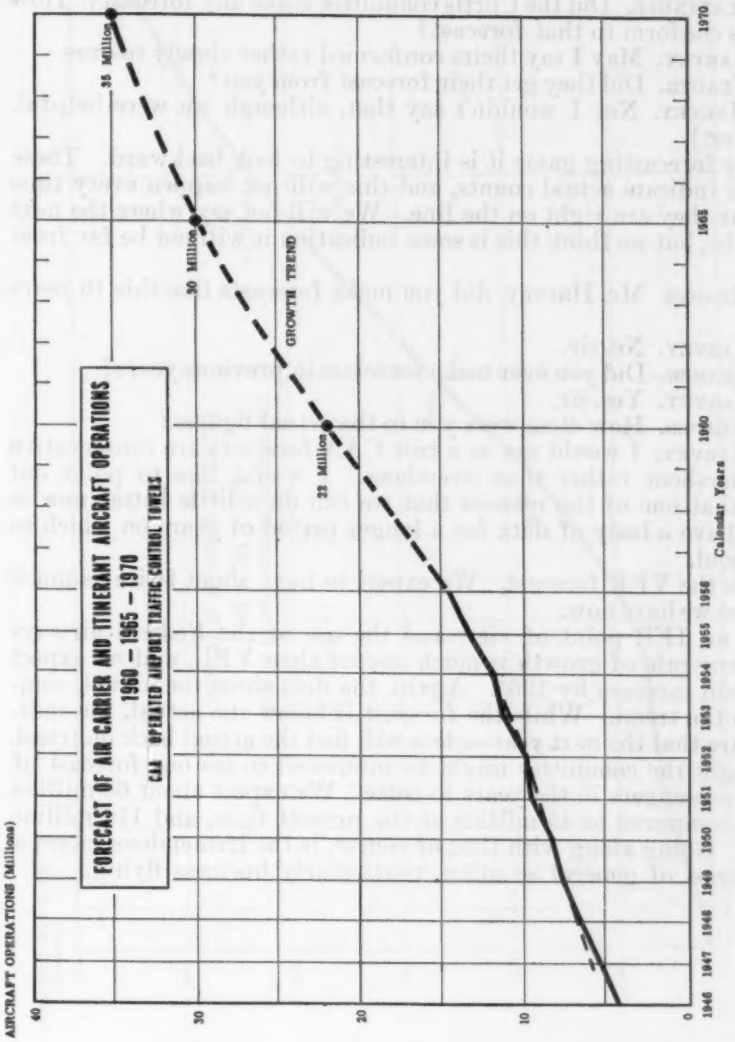
Mr. HARVEY. The highest rate of growth, but the greatest amount of growth was in the air carrier.

An interesting point is the amount of IFR military traffic in 1957. The number of instrument approaches in 1957 is about the same as the total of all types of traffic in 1950. This indicates the problem CAA has in keeping abreast of the growth of traffic.

Mr. PYLE. Mr. Chairman, you put your finger on one of the points that is most important, and that is that the rate of growth is increasing rapidly in both military and general aviation. In both areas you notice the green and yellow lines have a steeper curve to them than do the air carrier, and this presents a real problem to us not only in the operation of our facilities but in other areas as well. In the supervision of general aviation, for instance, there are as many of the so-called Apaches and Bonanzas and others as there are airline aircraft flying today. They have the same equipment to fly in bad weather, and we hope the same proficiency in the pilot.

At the time of our last appearance before this committee, the capacity of our air traffic control system was on the order of 12,000 IFR flight plans per day. As a result of our work in the past 2 years, the capacity of our system has now reached something on the order of 17,000 IFR flight plans per day. This is a major increase in the capacity of our system. However, it must be compared with the explosive rate of growth of the total air traffic of the United States, which Mr. Harvey has just referred to.

We have some charts which display the tremendous growth in our air traffic, which I think you will find interesting. This of course is the material from which we work in the preparation of our Federal airway plan.


FORECAST OF AIR CARRIER AND ITINERANT AIRCRAFT OPERATIONS
1960 – 1965 – 1970
CAA OPERATED AIRPORT TRAFFIC CONTROL TOWERS
35 Million
30 Million
23 Million
GROWTH TREND
AIRCRAFT OPERATIONS (Millions)
40
30
20
10
0
1946 1947 1948 1949 1950 1951 1952 1953 1954 1955 1956 1960 1965 1970
Calendar Years

Mr. HARVEY. I thought it might be interesting to go forward into what we think will happen in the years ahead. The forecast made in 1956 indicates we will go from about 15 million itinerant operations in 1956 to 22 million in 1960, to 30 million in 1965, and 35 million in 1970.

Mr. PLAPINGER. Did CAA make this?

Mr. HARVEY. This is CAA's forecast. We have a booklet published, if it would be interesting to the committee.

Mr. PLAPINGER. Did the Curtis committee make any forecast? How does this conform to that forecast?

Mr. HARVEY. May I say theirs conformed rather closely to ours.

Mr. MEADER. Did they get their forecast from you?

Mr. HARVEY. No; I wouldn't say that, although we were helpful. [Laughter.]

In this forecasting game it is interesting to look backward. These blue dots indicate actual counts, and this will not happen every time but so far they are right on the line. We will not say where the next one will be, but we think this is some indication it will not be far from the line.

Mr. MEADER. Mr. Harvey, did you make forecasts like this 10 years ago?

Mr. HARVEY. No, sir.

Mr. MEADER. Did you ever make forecasts in previous years?

Mr. HARVEY. Yes, sir.

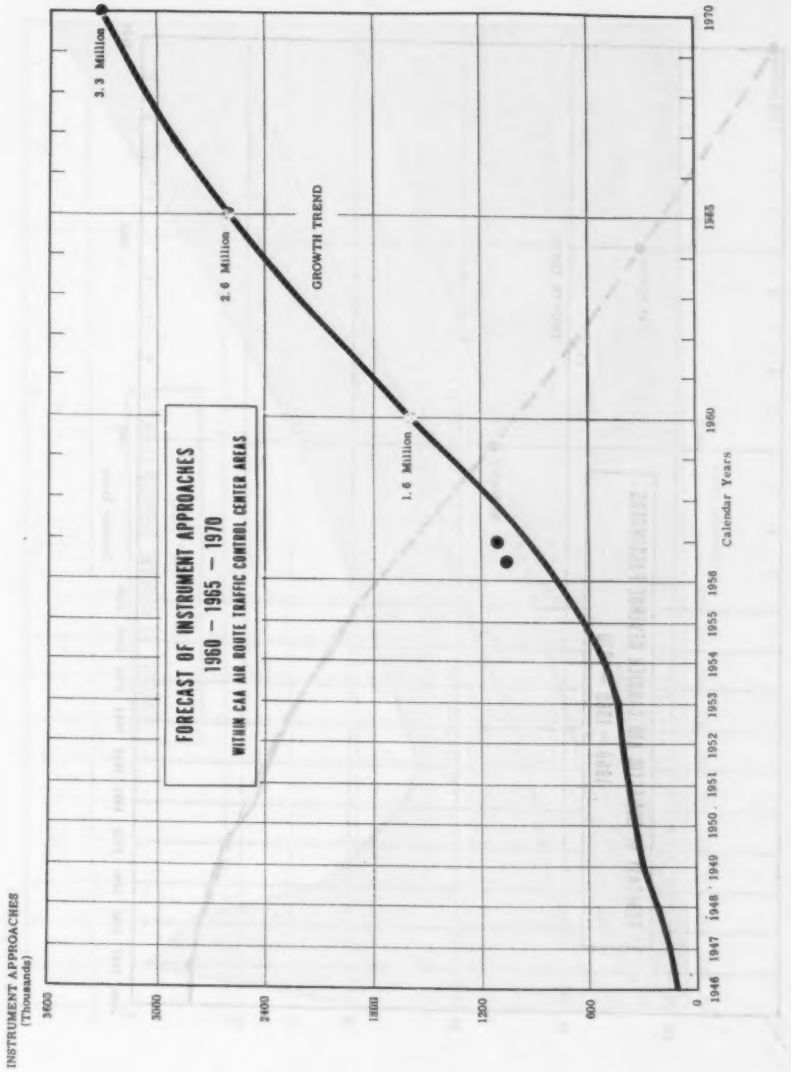
Mr. MEADER. How close were you to the actual figures?

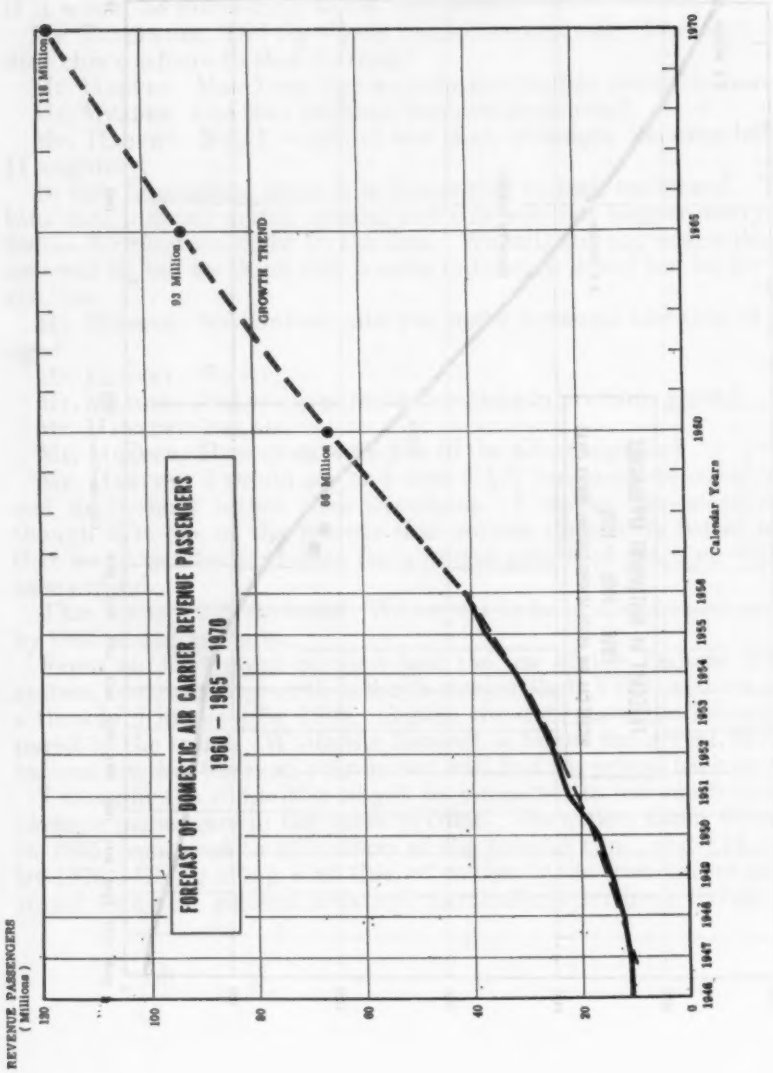
Mr. HARVEY. I would say as a rule CAA forecasts are conservative and undershoot rather than overshoot. I would like to point out though that one of the reasons that we can do a little better now is that we have a body of data for a longer period of years on which to base a trend.

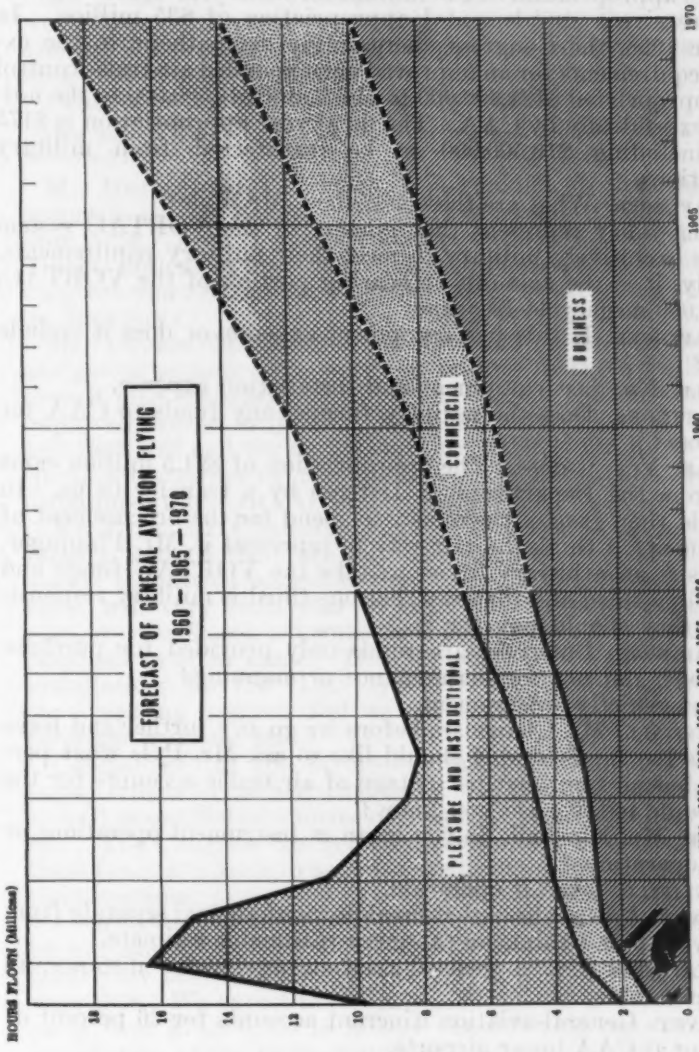
This is the VFR forecast. We expect to have about twice as much by 1965 as we have now.

From an IFR point of view and the use of the Federal airways system, our rate of growth is much steeper than VFR, and we expect a threefold increase by 1965. Again, the dots show the actual, compared to the trend. While the forecast is below the actual, the indications are that the next year or two will find the actual back on trend.

I thought the committee might be interested to see our forecast of revenue passengers in the years to come. We expect about 66 million in 1965, compared to 45 million at the present time, and 118 million by 1970. Going along with this, of course, is the tremendous increase in all forms of general aviation, particularly business flying.


FORECAST OF INSTRUMENT APPROACHES
1960 – 1965 – 1970
WITHIN CAA AIR ROUTE TRAFFIC CONTROL CENTER AREAS
GROWTH TREND
3.3 Million
2.6 Million
1.6 Million
INSTRUMENT APPROACHES
(Thousands)
3600
3000
2400
1800
1200
600
0
1946 1947 1948 1949 1950 1951 1952 1953 1954 1955 1956 1960 1965 1970
Calendar Years


FORECAST OF DOMESTIC AIR CARRIER REVENUE PASSENGERS
1960 – 1965 – 1970
REVENUE PASSENGERS
(Millions)
Calendar Years
GROWTH TREND
118 Million
93 Million
68 Million
120
100
80
60
40
20
0
1946
1947
1948
1949
1950
1951
1952
1953
1954
1955
1956
1960
1965
1970


FORECAST OF GENERAL AVIATION FLYING
1960 — 1965 — 1970
BUSINESS
COMMERCIAL
PLEASURE AND INSTRUCTIONAL
HOURS FLOWN (Millions)
Calendar Years
0
2
4
6
8
10
12
14
16
18
1946
1947
1948
1949
1950
1951
1952
1953
1954
1955
1956
1960
1965
1970

31829—59——10

So, we are face to face with a rapid growth that has caused a need for a Federal airway plan, and the rate of growth in the future indicates a continuing need at a greater rate.

Mr. PYLE. Mr. Chairman, are there any questions on those graphs?

Mr. BLATNIK. No questions.

Mr. PYLE. When we appeared before you in 1956, we had just received an appropriation of $40 million for fiscal year 1957, and were about to receive a supplemental appropriation of $35 million. In fiscal year 1958, the Congress, increasingly sympathetic to the expanding requirements for an improved and expanded air-traffic control system, appropriated $124,600,000 to CAA and $21,500,000 to the military for expenditure by CAA. The fiscal year appropriation is $175 million, including $16,500,000 to be transferred from military appropriations.

Mr. PLAPINGER. What are these transfers, Mr. Pyle?

Mr. PYLE. They represent that portion of the VORTAC system which was exclusively military to meet their military requirements. Specifically, it is the azimuth or bearing portion of the VORTAC, and the 1,000-megacycle frequency.

Mr. PLAPINGER. Is this just equipment expense, or does it include personnel?

Mr. PYLE. No; just equipment and installation expense.

Mr. PLAPINGER. Does the military furnish any funds to CAA for that purpose?

Mr. PYLE. Yes; it does. The appropriation of $21.5 million came directly from the Department of Defense by a transfer to us. In other words, they gave us the money to spend for the procurement of this equipment. I think the fair way to represent it, Mr. Plapinger, is that this is an arbitrary division; take the VORTAC funds and split them in a third and then say that one-third is military responsibility and they should pay for it.

Mr. PLAPINGER. But these are funds only provided for purchase of equipment, and not for maintenance or manning?

Mr. PYLE. Strictly procurement.

Mr. MINSHALL. Mr. Chairman, before we go any further and leave these charts too far behind, I should like to ask Mr. Pyle what percentage of business or what percentage of air traffic accounts for the air-taxi people today. Do you know?

Mr. PYLE. Mr. Minshall, do you mean in instrument operations or in overall operations?

Mr. MINSHALL. Overall operation.

Mr. HARVEY. I do not have that breakdown of air taxi separate from business flying, but I think we can get a reasonable estimate.

Mr. PYLE. We give a general-aviation figure, for instance, in itinerant operations.

Mr. HARVEY. General-aviation itinerant accounts for 26 percent of all the flying at CAA tower airports.

Mr. MINSHALL. That would include private air operation?

Mr. HARVEY. Yes.

Mr. MINSHALL. Not necessarily airplanes for hire for individuals?

Mr. HARVEY. It would include all civil except air carrier.

Mr. MINSHALL. What I would like is the for-hire phase.

Mr. HARVEY. For business only?

Mr. MINSHALL. If I went out and hired a private ship to go from here to Cleveland, how many operations like that do you have a day throughout the country?

Mr. HARVEY. I do not know, sir. We can try and get you an estimate.

Mr. MINSHALL. I would like just a rough estimate.

Mr. PYLE. We will attempt it. This becomes a little difficult to break down. It is hard to get that, but perhaps through the NATA, who has a representative here today, we could work together to get some kind of a figure at least.

(The following information was furnished:)

This agency has no data on taxi operations. However, such data may be developed in the 1957 aircraft use survey which is in preparation.

Mr. MEADER. Mr. Chairman, I just added up these figures of appropriations. If I added correctly, I came up with about $395 million since 1956. Now, I just wonder how that is reconciled with Mr. Tippets' statement that the system is going to cost $300 million. Have we given you $95 million too much that you are going to put back in the Treasury?

Mr. TIPPETS. Mr. Meader, we were talking only of the VORTAC navigation system. We were not talking of the overall plan. The overall plan includes such things as communications and radar and improved center facilities. Our plan at the moment between 1957 and 1963 will call for an expenditure of $1,248 million. I was only specifically answering the question as to how much the VORTAC program or the VORTAC system cost.

Mr. PYLE. Mr. Chairman, at page 53 it lines it out year by year by facility, and, if there are any questions, we will be glad to try to answer them with respect to that table. I might point out that this table, will vary from year to year. As we modify and refine this plan, we may knock out some facilities, and we may have to put more emphasis in other areas. This happened in the case of the TACAN installations for the ILS. We deferred those because all of us in the operating business feel we could well afford to do this, putting emphasis in other areas.

Continuance of the favorable appropriations—and I would like to pay tribute to the help that this committee has given us in this area, as well as our Subcommittee on Appropriations, chaired by Mr. Preston. The Congress has helped us materially in our work by making these funds available to us. We are deeply appreciative and aware of this assistance.

Continuance of the favorable appropriations has been warranted by our ability to obligate the funds in a satisfactory manner. In fiscal year 1957, $75,700,000 was obligated, and $143,000,000 in fiscal year 1958. We expect to obligate $120,300,000 in fiscal year 1959, and carry over $74,200,000 to finance the building construction and the installation of the large quantities of equipment which we will have on hand in fiscal year 1960 as a result of deliveries on contracts made in the preceding years. In this regard, the expanded airway programs, during the period 1957–63, will call for expenditures for new equipment and facilities of approximately $1,200,000,000.

Mr. Chairman, at the risk of injecting, perhaps, a slightly personal note in these proceedings, I would like to point out that Mr. Tippets'

division, the Office of Air Navigation Facilities, has done an outstanding job in the maner in which they have carried out the mandate of the Congress to get going. The men have been working day and night. I would also like to add to that, incidentally, that the General Services Office, which handles the procurement, has the contracting officers, and so forth, have done a terrific job in this area, and I think they deserve a word of commendation, on the record, for the job they have done.

Mr. PLAPINGER. You do not do your own procurement?

Mr. PYLE. This is General Services within our own shop.

Mr. PLAPINGER. I see.

Mr. PYLE. We have an administrative department which does the procurement, contracting, and so forth.

Mr. PLAPINGER. GSA does not do any procurement for you?

Mr. PYLE. No. I think it is an outstanding job, and I think it is in line with the mandate of Congress, as I said, to get going, and I am proud of them.

During fiscal year 1957, extended efforts were made to establish the necessary programs to control all airspace at high altitudes and, in order to accomplish this, it was necessary that a direct controller-to-pilot communication system be implemented and a program was undertaken to provide long-range radars for the air route traffic control centers. Control of all airspace at and above 24,000 feet was inaugurated December 1, 1957, and we are striving to develop a capability of lowering the control of all airspace to 15,000 feet this fiscal year.

Mr. WESTLAND. Mr. Pyle, just what do you mean by "long-range radar"?

Mr. PYLE. I think we have a picture of one right there. This is our installation at Indianapolis. The difference between the so-called short-range or airport surveillance radar and this unit is in its power and ability to see out. It will see an airplane, even a jet, at about 120 miles, and if it has reinforcement, such as IFF, it will pick it up almost as far as 200 miles. It is comparable to some of the Navy and Air Force long-range radars. In fact, this one is actually a combined specification which the military and ourselves have worked together in getting the best possible piece of equipment.

Mr. WESTLAND. There has not been much improvement in long-range radar as far as distance is concerned in the last 10 years.

Mr. PYLE. It is a line-of-sight problem.

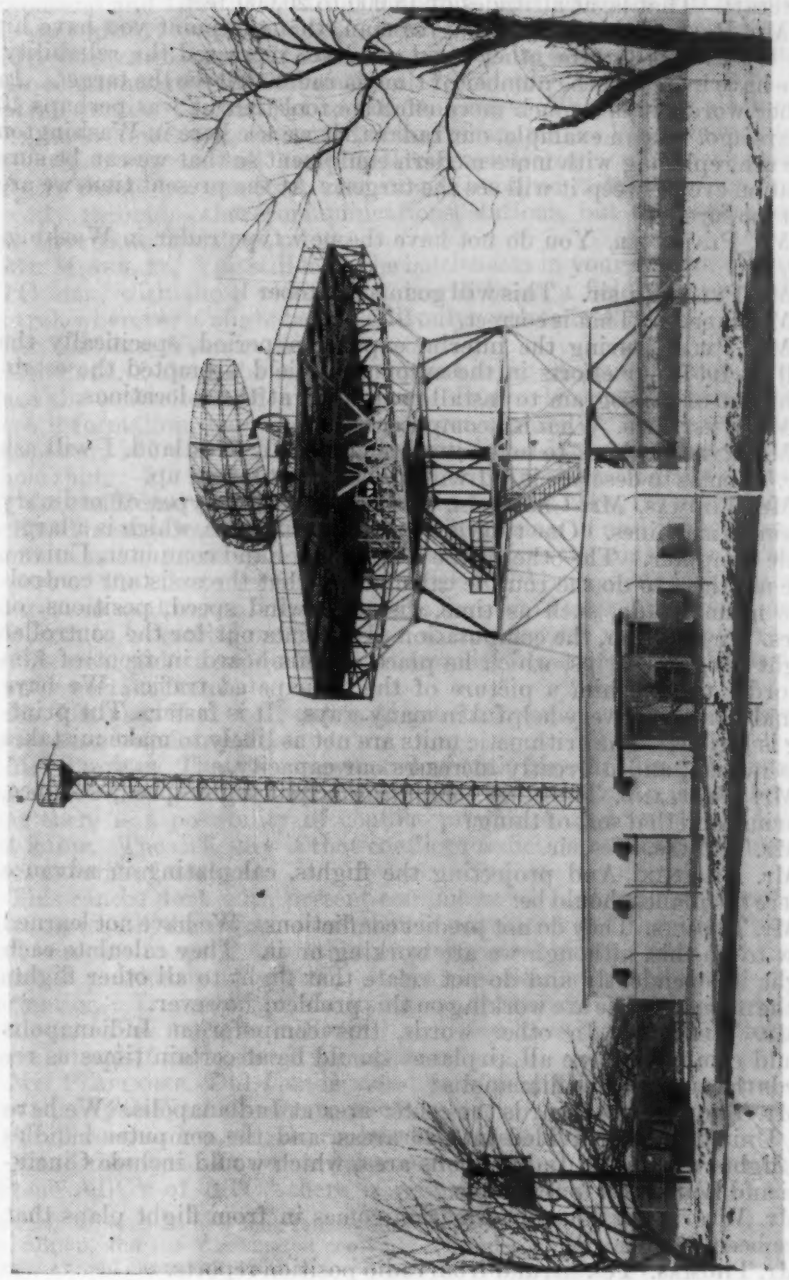
Mr. WESTLAND. I understand that.

Mr. PYLE. If the airplane will get high enough, we can see it provided the target is big enough. And of course you can build up the power with expensive equipment and see them farther out. The military are working on these kinds of programs, but they are looking for, basically, a missile at much higher altitudes than we would ever have to cover.

Mr. WESTLAND. But when you say "long-range radar" you mean about 125 to 150 miles, of course depending on altitude?

Mr. PYLE. And 95 percent on each sweep, or something on that order. There is a technical description for it.

Mr. TIPPETS. The Congressman is right. It is a function of the size of target, altitude, and distance; and if we have to reinforce, we must use the beacon, to get smaller targets farther away.



Mr. WESTLAND. But with optimum conditions what is your range?

Mr. TIPPETS. About 150 miles for the average air carrier kind of aircraft. That is, at altitudes of 18,000 to 20,000 feet.

Mr. PYLE. I think, Mr. Congressman, that the point you have hit on is correct. On the other hand, we have increased the reliability. We have increased the number of times a radar will see the target. In other words, it is a much more effective tool than it was perhaps 10 years ago. As an example, our radar that we use here in Washington we are replacing with more modern equipment so that we can be sure that on every sweep it will see the target. At the present time we are not too sure.

Mr. PLAPINGER. You do not have the new type radar in Washington?

Mr. PYLE. No, sir. This will go in on October 1.

Mr. TIPPETS. That is correct.

Mr. PYLE. During the interim expansion period, specifically the fall of 1957, our efforts in the automation field prompted the establishment of a program to install computers at three locations.

Mr. WESTLAND. What is a computer?

Mr. PYLE. I think to make it more clear, Mr. Westland, I will ask Mr. Thomas to describe it. I will probably get mixed up.

Mr. THOMAS. Mr. Chairman, we are using two types of ordinary business machines. One type is the IBM 650 Ramac, which is a large-scale computer. The other is the Remington Rand computer, Univac. We use these to do the routine calculations that the assistant controllers normally do, such as time, distance, wind speed, positions, or fixes. In addition, the computation also prints out for the controller flight progress strips, which he places on his board in front of him in order to give him a picture of the anticipated traffic. We have found that this is very helpful in many ways. It is faster. The printing is legible. The arithmetic units are not as likely to make mistakes as a human, and it greatly increases our capacity.

Mr. WESTLAND. These are computing actual flight speed, distance, bearing, and that sort of thing?

Mr. THOMAS. Yes, sir.

Mr. BLATNIK. And projecting the flights, calculating in advance where the planes should be.

Mr. THOMAS. They do not predict conflictions. We have not learned how to do this, although we are working on it. They calculate each flight independently and do not relate that flight to all other flights at the moment. We are working on this problem, however.

Mr. WESTLAND. In other words, this computer at Indianapolis would compute where all airplanes should be at certain times as regards the airport at Indianapolis?

Mr. THOMAS. As regards the center area at Indianapolis. We have the United States divided into 26 areas, and the computer handles all flights within the Indianapolis area, which would include Cincinnati and Louisville, for example.

Mr. WESTLAND. That information comes in from flight plans that have been filed?

Mr. THOMAS. Yes, sir, and from radio position reports.

Mr. MINSHALL. Based on a typical situation, how much time will a computer save in a particular instance over a manual operation?

Mr. THOMAS. Considerable time. This will do up to 10,000 computations per second. Actually, in New York, for example, we will run a thousand and 1,200 fix postings an hour. The computer will handle this very nicely.

Mr. WESTLAND. Are all those aircraft they are computing on within radio communication of that station?

Mr. THOMAS. Yes, sir, in two different ways. They are not all line-of-sight to New York, obviously, or to Indianapolis. We have remote sites which we can call peripheral communications, where we talk directly through a remote transmitter a hundred miles away, or, indirectly through other communications stations, but the controller does have contact with all pilots.

Mr. MINSHALL. You still have the bottlenecks in your system. Your ATC man, with those planes that might be at a field on approach control, wherever it might be, can still only work so fast.

Mr. THOMAS. Yes, sir, that is correct.

Mr. PYLE. I think the important point is the computer does not replace the controller and his function. It merely provides him with more information, more accurately, more legibly, at some saving in manpower, but you still have the controller. He is the key to the whole thing. He works with the flight strips in separating and directing the traffic and exercises the judgment factor. Now, the next stage, as Mr. Thomas describes, is the computer getting in and anticipating conflicts and suggesting rerouting, or altering to the controller. This is part of the effort that we, jointly with the Airways Modernization Board, are working on. These are the first timid steps in automation. We have to be candid on that. But at least we are making progress in this area, and we are getting a lot more legible strips, which in itself is an important factor.

Mr. MEADER. You don't expect to get this conflict information from your present equipment?

Mr. THOMAS. That is somewhat doubtful, Mr. Meader. We have got a lot of people working on computer programs, and some think that there is a possibility of conflict prediction right now. We do not know. The difficulty is that conflict prediction requires a tremendous amount of storage.

This can be done with present computers without too much traffic, if it stores all the information that is computed and then goes back and searches to see if any other airplane is within the time and distance it previously computed. Right now, it does not store the information. It simply prints it out, and, therefore, we can get by with a smaller machine. We will probably have to have more magnetic storage if we do search for conflicts.

Mr. PLAPINGER. Did I understand you to say the long-range radar was coming to Washington around October?

Mr. THOMAS. Yes, sir; the replacement, the ARSR–1.

Mr. PLAPINGER. In your document of March 13, 1957, entitled "Some ABC's of ATC" there is reference to the fact that CAA—

recently ordered 23 new long-range radars for use at its 10 centers at a cost of $9 million, and the Washington center is scheduled to get the first production model around January 1, 1958.

Mr. THOMAS. This was changed and went to Indianapolis. Incidentally, I would like to add that this morning, in the rain, we were

not seeing very well with radar out of Washington National. With this new radar's circular polarization, we will be able to see through this rain without difficulty.

Mr. PLAPINGER. What about the problem of the jet?

Mr. THOMAS. This is very much better on the jet; in fact, a tremendous improvement, I would say, on the jet.

Mr. PYLE. Returning to the statement, considerable study and experience has been gained in the use of the computer in the air traffic control system of work done by the TDC at Indianapolis. It is planned that, this fall, a computer network of the three locations mentioned, Indianapolis, Washington, and New York, will be established. Further, in the field of automation, we plan during fiscal year 1959 to add five more computer-equipped locations to this network—Boston, Cleveland, Detroit, Pittsburgh, and Chicago. Perhaps it will become obvious why we are planning in this manner from the chart.

Mr. HARVEY. The computer program is so designed to take care of the Golden Triangle referred to, bounded by Chicago, Boston, and Washington. This is the area for our first computers—where the flow of traffic is the greatest.

Mr. PLAPINGER. What about SAGE? Do you use SAGE, if I may use that terrible word?

Mr. THOMAS. It is not a terrible word, nor are we using it in the context that you ask. We do jointly use the raw radar information. In fact, our whole program is based on joint use of basic radar. We are working with AMB on a project to determine to what extent—not if, but to what extent—we use SAGE information and where we use it.

Mr. PLAPINGER. I was thinking more of conflict. You talked about computing when the aircraft will converge.

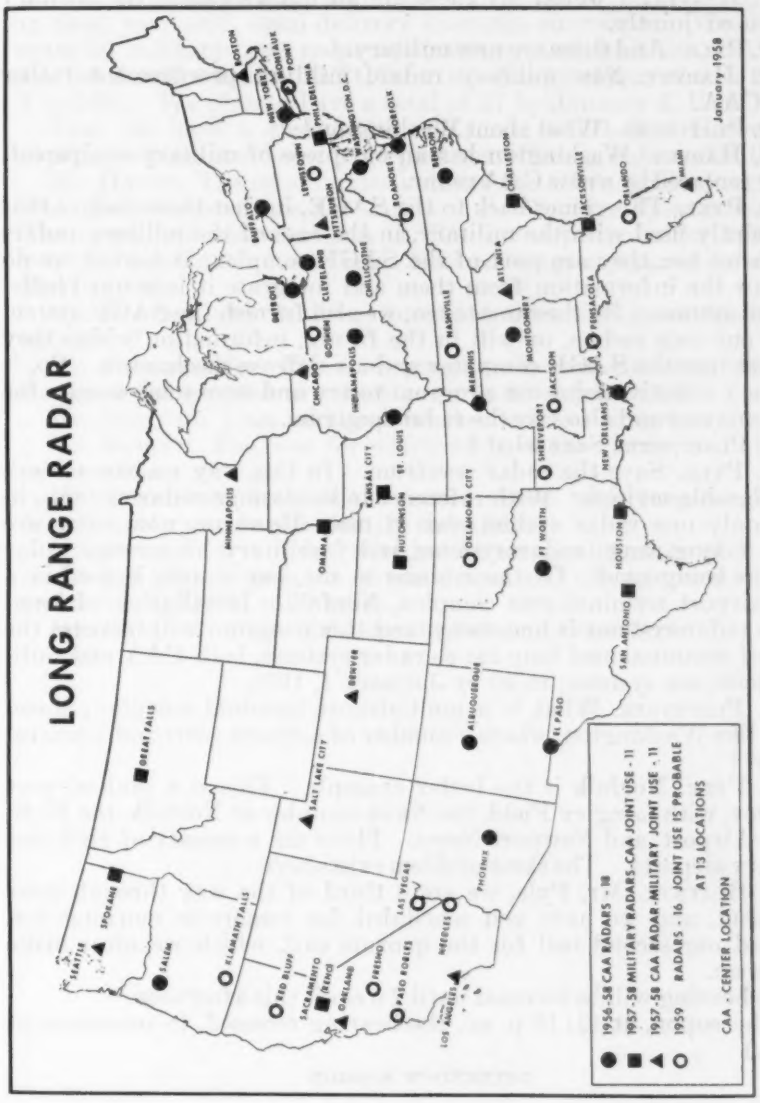
Mr. THOMAS. Well, the computer that is used in SAGE does compute conflict between aircraft targets as directed. However, the computer program for air defense is different from the one required in air-traffic control. Without getting into the computer detail, it is not suitable for both purposes, simultaneously.

Mr. PLAPINGER. Is there any research going on, on using SAGE for air traffic development purposes by you?

Mr. THOMAS. Yes, with AMB; jointly with them and the Air Force.

Mr. PYLE. Since the 1956 hearings, we have established long-range radars in the New York, Norfolk, and Chicago terminal areas. These radar systems, together with the previously established radar system in the Washington center, have shown us most emphatically that we are able to handle air traffic more expeditiously and safely in those areas where radar and direct controller pilot communications are provided.

Now, we have seen a long-range radar picture. These are the installations that are now in operation, as well as those planned. Mr. Harvey, you might point out those that are now in operation.


LONG RANGE RADAR
January 1958
1956-58 CAA RADARS - 18
1957-58 MILITARY RADARS-CAA JOINT USE - 11
1957-58 CAA RADAR-MILITARY JOINT USE - 11
1959 RADARS - 16 JOINT USE IS PROBABLE
AT 13 LOCATIONS
CAA - CENTER LOCATION
BOSTON
NEW YORK
MOUNTAUK POINT
PHILADELPHIA
WASHINGTON D.C.
NORFOLK
BUFFALO
LEWISTOWN
PITTSBURGH
ROANOKE
CLEVELAND
DETROIT
CHICAGO
GOSHEN
INDIANAPOLIS
CHILLICOTHE
NASHVILLE
MEMPHIS
ATLANTA
CHARLESTON
JACKSONVILLE
ORLANDO
MIAMI
MONTGOMERY
PENSACOLA
JACKSON
SHREVEPORT
NEW ORLEANS
MINNEAPOLIS
OMAHA
KANSAS CITY
ST. LOUIS
HUTCHINSON
OKLAHOMA CITY
FT WORTH
HOUSTON
SAN ANTONIO
GREAT FALLS
DENVER
SALT LAKE CITY
ALBUQUERQUE
EL PASO
SEATTLE
SPOKANE
SALEM
KLAMATH FALLS
RED BLUFF
SACRAMENTO
FRESNO
OAKLAND
PASO ROBLES
LOS ANGELES
BAKERSFIELD
LAS VEGAS
PHOENIX

Mr. HARVEY. The fiscal year 1959 program is shown by the open circle; the 1956–58 is the solid circle, while squares and triangles indicate military-CAA joint use.

Mr. PLAPINGER. Are these new ones, or the old military? Which are the old and which are the new?

Mr. HARVEY. I would say these are all CAA's except the military ones used jointly.

Mr. PYLE. And those are new military.

Mr. HARVEY. New military radar; military procurement rather than CAA.

Mr. PLAPINGER. What about Washington?

Mr. HARVEY. Washington has an old piece of military equipment, being replaced by a new CAA radar.

Mr. PYLE. This comes back to the SAGE, in that those radars that are jointly used with the military, in the case of the military radars which we use, they are part of the SAGE complex, and what we do is draw the information from them and integrate it into our traffic-control system. By the same token, we also furnish the SAGE system from our own radars, or will in the future, information which they can put into the SAGE computer and air-defense mechanism. So, it is a very effective joint-use program to try and save some money for the taxpayers and also save the radar spectrum.

Mr. PLAPINGER. Save what?

Mr. PYLE. Save the radar spectrum. In this way we can achieve considerable savings. With reference to long-range radar systems, in 1956 only one radar system was in use. However, now there are 4 CAA long-range radar systems and 2 military long-range radar systems being used. Of the systems in use, one system is used in a multiairport terminal-area complex, Norfolk. Installation of long-range radar systems is underway, and this program will increase the total of commissioned long-range radar systems, both CAA and military joint-use systems, to 40 by January 1, 1960.

Mr. PLAPINGER. What is a multiairport terminal complex; something like Washington, where a number of airports surround a central airport?

Mr. PYLE. Norfolk is the better example. This is a multiairport complex, with Langley Field, the Navy complex at Norfolk, the Richmond Airport, and Newport News. There are a variety of civil and military airports. The same problem exists here.

Mr. BLATNIK. Mr. Pyle, we are a third of the way through your statement, and we have you scheduled for tomorrow morning yet. We had our second bell for the quorum call, which we must make very soon.

The hearing will be recessed until 2 o'clock this afternoon.

(Whereupon, at 12:15 p. m., the hearing recessed, to reconvene at 2 p. m.)

AFTERNOON SESSION

Mr. BLATNIK. The Legal and Monetary Affairs Subcommittee of the House Government Operations Committee will continue the hearing of this morning, receiving a statement by and from the Honorable James T. Pyle, Administrator of the Civil Aeronautics Administration.

Mr. Pyle, would you continue your testimony? I believe we left off at the bottom of page 7 when the quorum bells rang this noon.

Mr. PYLE. So I will now continue on the top of page 8.

A total of 45 short-range radar systems, airport surveillance radar—and we technically know them as ASR's—are now in operation. We have on order 33 additional systems which will be installed beginning in fiscal year 1960, upon delivery from the contractor. We now operate 20 military-type radar approach control facilities, RAPCON for the Air Force and RATCC for the Navy, compared to a total of 7 in 1956. We plan to have a total of 27 by January 1, 1960.

Now, we have a chart, Mr. Chairman, which Mr. Harvey will explain to you, showing the airport surveillance radars, ASR's.

Mr. HAVEY. The solid circles indicate the CAA ASR's programed. The green squares are the military ASR's Mr. Pyle referred to. The open dots indicate CAA ASR's in the program for 1959. As you can see, CAA have a large ASR coverage compared to what we had in 1956.

Mr. BLATNIK. By facilities program, does that mean facilities in operation?

Mr. HARVEY. No. Facilities programed were the ones for which Congress has granted us money prior to fiscal year 1959.

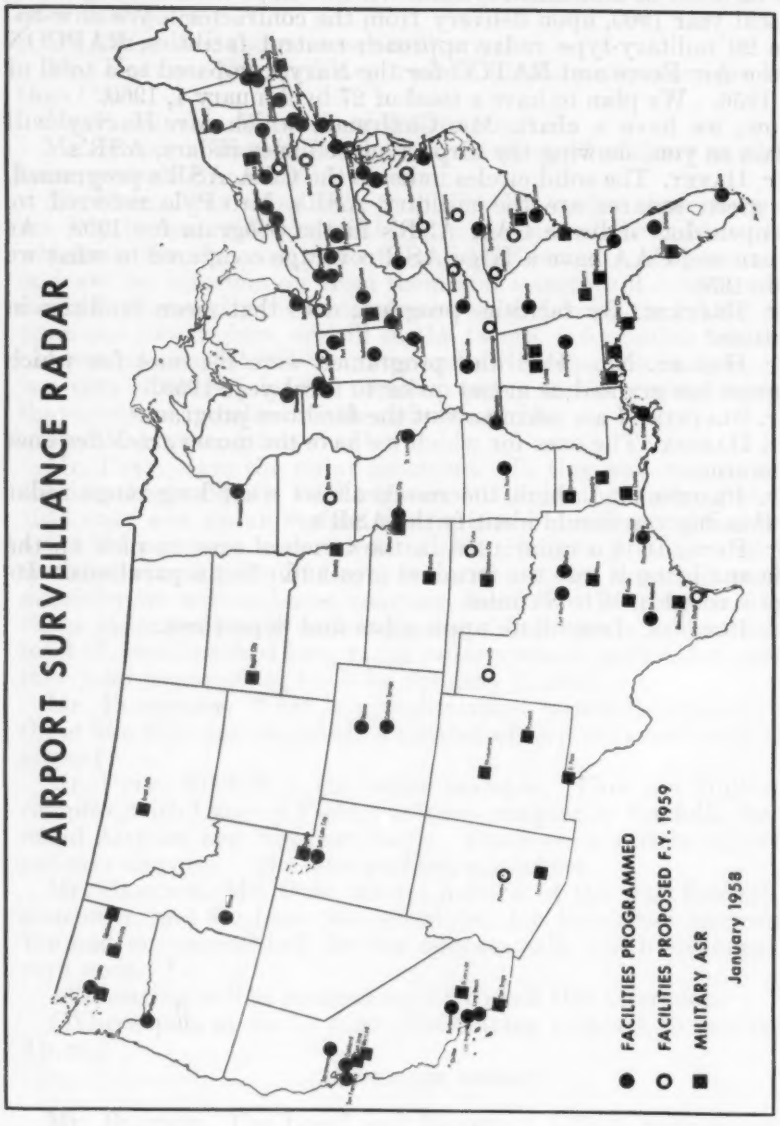
Mr. BLATNIK. I am asking about the facilities program.

Mr. HARVEY. The ones for which we have the money, includes ones in operation.

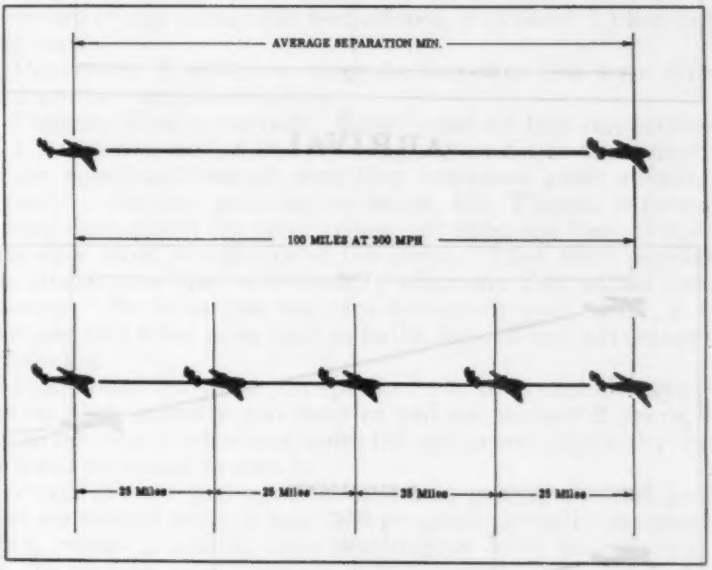
Mr. PLAPINGER. I think the record shows what long-range radar is. Possibly you should identify the ASR's.

Mr. PYLE. It is a radar used in the terminal area to pick up the traffic and bring it into the terminal area and effect separations. Its range is roughly 35 to 50 miles.

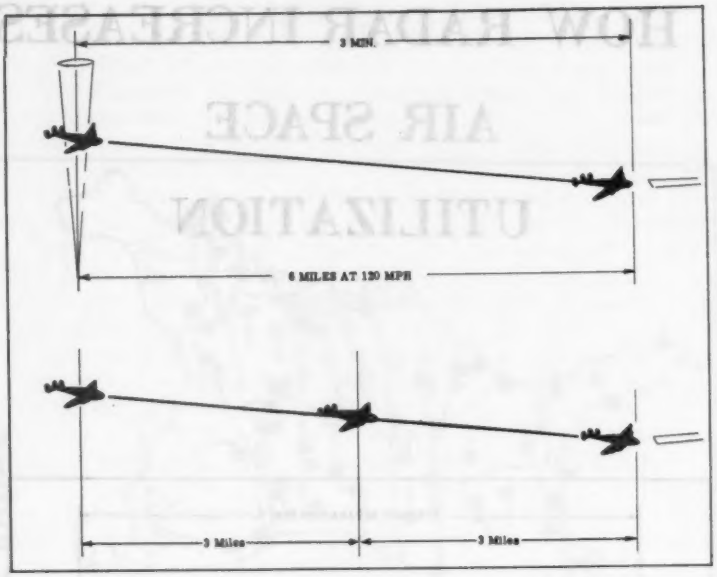
Mr. BLATNIK. Immediate approaches and departures.


AIRPORT SURVEILLANCE RADAR
FACILITIES PROGRAMMED
FACILITIES PROPOSED F.Y. 1959
MILITARY ASR
January 1958

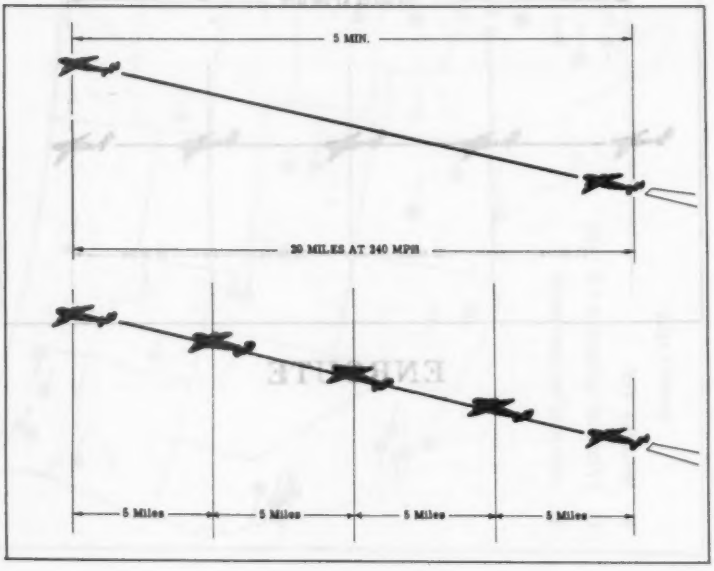
HOW RADAR INCREASES AIR SPACE UTILIZATION



ENROUTE



ARRIVAL



DEPARTURE

Mr. PYLE. That's right, used for approach and departure control, correct. We will pick them off out West from the long-range radar and bring them into the terminal radar and then bring them into the ILS course and bring them into the approach.

Mr. PLAPINGER. What is the time lag? For instance, we spoke in our last hearings about a 5-year airways modernization plan and then we were talking about acceleration to 3 years. What does that mean actually in terms of installation of facilities and equipment?

Mr. PYLE. I'd like to make a preliminary comment and have it supplemented by Mr. Tippets if there are any points he feels will be helpful. Roughly, when you place an order with a manufacturer for radar, either short range or long range, it is about 24 months from the day you place the order until it is delivered, installed, the people trained to operate and maintain it.

Is this about correct for a time scale?

Mr. TIPPETS. Yes. In the case of the ASR radar, the one you are talking about, the contract calls for delivery beginning in 24 months. Some equipment we get in 18 months, some in a shorter time. But where we are trying to buy the best offered, it is about 2 years before delivery starts.

Mr. PLAPINGER. Notwithstanding the fact that you have ordered this and similar equipment before?

Mr. TIPPETS. That is correct. Every year we buy improvements, which I mentioned earlier this morning. Sometimes these improvements are significant enough that they introduce great advantages. For example, circular polarization which Mr. Thomas referred to. For a long time, one of the great nemeses of radar has been that, when it rains very hard, it obliterates the scope. They have devised an electric circuit now that will literally eliminate this, called circular polarization. So when you buy this feature in your radar, it costs more money and takes more time to build, but the end advantages are overwhelming.

Mr. PLAPINGER. So when you speak of a 3- or 5-year airways modernization plan, actually you have to add on another 2 years, with respect to the time it takes to acqiure the equipment physically, install it and train personnel to man it.

Mr. PYLE. We are just now, for instance, getting the end product of what we started with in our 1956 program, actually in operation. The first radar is coming into Washington here, long range. Of course, the first one was delivered in Indianapolis. You're right, it's a 2-year process on an average.

Tests are being conducted on radar airport surface detection, ASDE, at Idlewild Airport, N. Y. As a result of these tests, specifications will be drawn up to order 10 sets of this equipment for installation at large terminal airports. And I might just point out for the record that this in my opinion is a very necessary piece of equipment. The eye level at Idlewild is 176 feet. We are now operating at minimums of 200 feet, so we are only 25 feet in the tower below the cloud deck and operating, incidentally, too, at minimums of half a mile full visibility. So quite often the surface of the runway, the boys cannot actually see it. So we have to get some radar that will project the controller's sight beyond what he can actually see through

the fog. I think the minimums will shortly be coming down within a reasonable length of time.

Mr. PLAPINGER. You mean the controller can see only 176 feet out of the tower?

Mr. PYLE. He is 176 feet in the air. So that, if we lower the minimums below 200 feet, as soon as we can with safety, he may actually be in the tower in the clouds. So we have to provide some electronic eyes for him.

We are cooperating with the Airways Modernization Board in a test of the air traffic control radar beacon system, ATCRBS. These tests are designed to assist us in developing firm operating procedures and to secure technical data which will permit the best design of equipment. The test equipment will be installed in nine of our facilities and testing of this equipment should start by September 1, 1958.

Meanwhile, we have advanced in the improvement of the navigational system. VOR's and conversion to VORTAC projects are being accomplished; for example, on June 30, 1956, 85,404 miles of direct VOR airways were established while as of June 30, 1958, there was a total of 110,914 miles of direct VOR airways. These figures do not include the 32,680 miles of alternate VOR airways that were established as of June 30, 1958. During this period, established VOR's increased from 431 to 552.

Now, I believe we have a chart which shows the airway complex.

Mr. HARVEY. The VOR Victor Airway System as of June 15, 1958, shows the rather complete coverage being achieved. The heavy green lines indicate the 1500 series of airways.

Mr. PYLE. The Victor 1500 series, Mr. Chairman, are those high altitude airways.

Mr. PLAPINGER. Are these positive-control airways?

Mr. PYLE. Yes, there are some positive-control airways.

Mr. HARVEY. The positive-control airways are indicated in this chart. It is the same chart but highlighted a little differently.

Mr. PYLE. We come to that later, Mr. Chairman.

Mr. PLAPINGER. The $300 million figure referred to as the cost of VORTAC system, does that include the conversion to VORTAC as well?

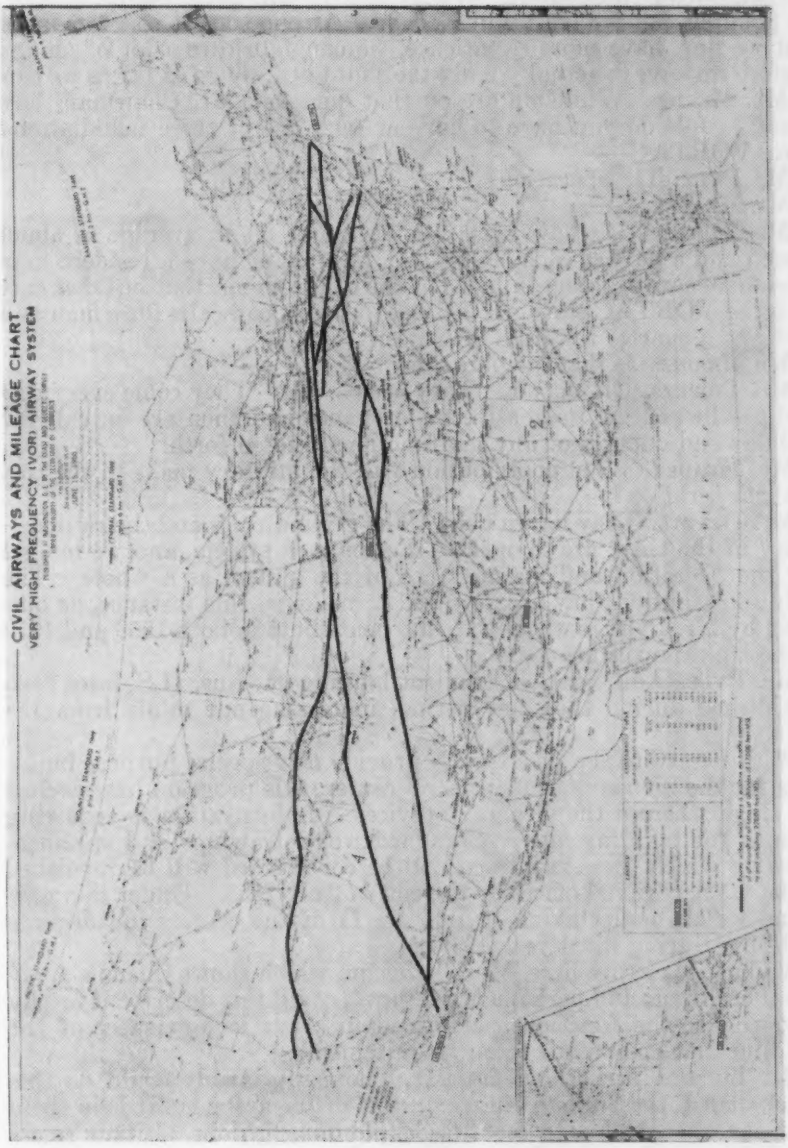
Mr. TIPPETS. Yes. The conversion VOR's now in the system and the building of new VORTAC completed.

Mr. PLAPINGER. When you install VORTAC at an installation, presumably there has been a VOR there before.

Mr. TIPPETS. Yes, sir.

Mr. PLAPINGER. What happens to the VOR station while you are installing? Does that continue in operation?

Mr. TIPPETS. Up to a point. We enlarge the building and put in the additional equipment required, standby engine generator; and everything we have to do, we do. And at a certain point we have to shut the facility down for about 30 days while we actually hook up electrically the TACAN and retune the facility.


CIVIL AIRWAYS AND MILEAGE CHART
VERY HIGH FREQUENCY (VOR) AIRWAY SYSTEM

Mr. PLAPINGER. What do the planes do in that interval?

Mr. TIPPETS. We use other procedures. Sometimes this works a hardship at a specific location if the weather is bad over a long period of time. We have coordinated this with the users and do the best we can during this period. We try to keep this period down as short as possible, but it take up to 30 days. At one time it was 2 months, but we now have more experience, we can fabricate a lot of things. Before we have to actually make the shutdown, we go as far as we can.

Mr. MEADER. While we are on that question, Mr. Chairman, how many people do you have to have at each one of these installations, these VORTAC——

Mr. PYLE. The operation?

Mr. MEADER. Yes.

Mr. TIPPETS. We have a maintenance man on an average of about a man and a half at each VORTAC, I think, or have a resident man who takes care of many things and one of the things that he takes care of is the VORTAC station. I think the workload calls for a man or a man and a quarter for VORTAC itself.

Mr. MEADER. Is that 24 hours a day?

Mr. TIPPETS. Oh, no, sir. They are on call. They come every day and do the routine preventive maintenance and then are on call for failures and outages or any malfunctions, and so forth.

Mr. MEADER. What contribution will the military make to the cost of that operation?

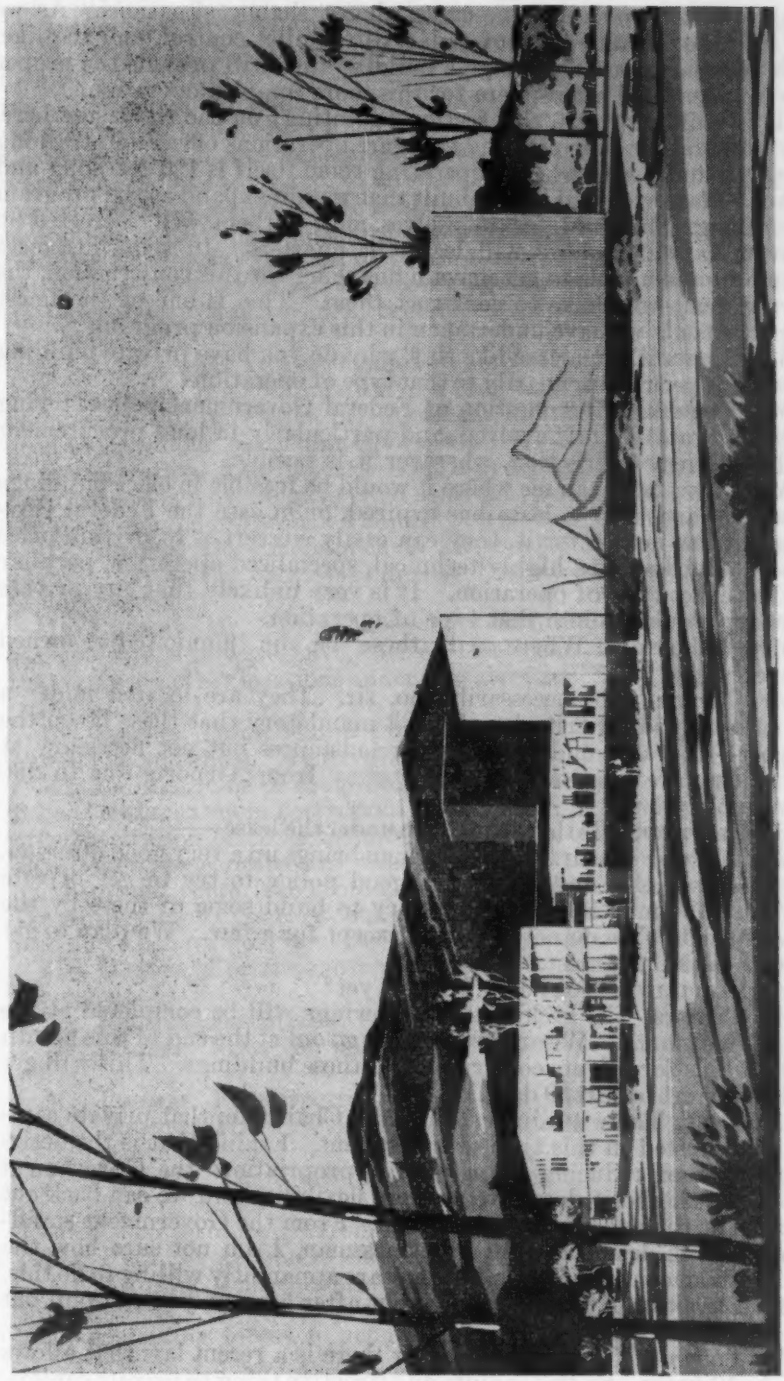
Mr. TIPPETS. They haven't sir. The ground rules and the responsibility of the CAA are to operate the common system, and we budget for the operation and maintenance of the system as a whole. The only contribution they are required to make in this instance, as outlined by Mr. Pyle, is where they did contribute in both 1958 and 1959 to the capital investment cost.

Mr. PYLE. Additional instrument landing systems, ILS, have been established during the same period, increasing our totals from 158 to 169.

With regard to the program to provide new special purpose buildings for the air route traffic control center, this program has reached the stage wherein the General Services Administration is acquiring options for building sites. Standard work drawings and specifications by which these buildings will be constructed will be furnished to the CAA regional offices by the end of July 1958. Under this program, we are undertaking to relocate 11 of the centers in adequate buildings during fiscal year 1959.

We have a picture here, Mr. Chairman, which shows this is a functional building; and perhaps Mr. Tippets could just describe it briefly to you as to the functions performed in a particular aspect of the building that are unique to our requirements.

Mr. TIPPETS. Mr. Chairman, Mr. Thomas probably could do this better than I, these are the nerve centers of the system. It is in these locations where the instrument flight planning is done, altitude reservations are made and where the general procedures are worked out. And as Mr. Thomas has explained, there are 26 flight areas in the United States. The center space at most of them, are in inadequate buildings that were made available to us 15 or 20 years ago; pretty



tight quarters and, in some cases, almost shabby situations. As we go into the expanded use of radar, direct pilot control, and the like, it is necessary for us to design a building that will provide the proper environment and atmosphere for this more complex operation.

This building itself, this section [pointing] on the right side here, is the operating quarters; and these are operations offices and training quarters and the like. The operating room itself is 120 feet long and about 60 feet wide and it is so built that we can expand as the program goes along. The buildings themselves, most of them, will be erected by private capital and we will lease the quarters. In some instances where we are unable to get private financing for this construction, the Government will have to construct them. This is one of the finest improvements we have undertaken in this expansion program.

Mr. BLATNIK. In a case like this, why do you have private building of what is peculiar primarily to that type of operation?

Mr. TIPPETS. It's a question of Federal Government policy, trying to get private capital involved, and particularly in land procurement and building construction, wherever it is posible.

Mr. BLATNIK. I can see where it would be feasible in office buildings downton, and after a lease has expired, or in case the Federal Government has no use for it, they can easily convert it to private office space. But here is a highly technical, specialized operation, peculiar to that exact type of operation. It is very unlikely that any private industry would go into that type of operation.

Mr. PLAPINGER. Where will these be, on municipally owned property?

Mr. TIPPETS. Not necessarily, no, sir. They are located under a variety of types of criteria. It isn't mandatory that these be on the airport—desirable under certain circumstances but not necessary at all. Some are located many miles away from Airports due to dispersal policy.

Mr. PLAPINGER. Is this being done under the lease——

Mr. TIPPETS. No, sir. The chairman brings up a very good question. We discussed this and it seems a good policy to try to get private capital. We may find it is necessary to build some of these by the Government. We do not plan that except for a few. We plan to get private capital for most.

Mr. PLAPINGER. You haven't done it yet?

Mr. TIPPETS. The architectural drawings will be completed at the end of this month. We are prepared to go out at the end of this month and get bids for private construction of these buildings. This will get under way in the next 30 days.

Mr. PYLE. There are indications, Mr. Chairman, that private capital is interested in this type of investment. I think that is the desirable factor of reducing the capital appropriations the Government has invested, and it does give us more flexibility and we can back out of them at the end of the 5-year term. From the Government standpoint, this is desirable. As a businessman, I am not sure how the businessman can justify this, but they are apparently willing to do this.

Mr. BLATNIK. Even if you back out after 5 years, you can pull out the operation?

Mr. TIPPETS. Yes, sir, but I think there is a recent law that allows it to be 10 years. So this is quite an attractive thing to private capital.

Mr. MEADER. Are you paying rent on your space now for your traffic control centers, for instance, the one out here?

Mr. BOYLE. Well, this varies, Congressman Meader, from location to location. Obviously at Washington National we are not paying rent. That is in one of our own buildings there, but in some locations we are paying rent. One of the problems that we face in the field of electronic installations generally is that, as the structure of the airways change, as they have, drastically, it is sometimes necessary to move your facility from where it has been into another location. The communications requirement just plain changes as the airway structure itself changes. Because of this we have, as a matter of general policy over the past 20 years, leased installations for communication stations, airway traffic control centers, all of these things, wherever possible.

So actually what we are engaged in here with the General Services Administration is a continuation of a long-time policy that, wherever possible we will lease from private ownership the installation that we need to house our particular equipment. We believe that we will be in these locations 5 to 10 years. But it is a possibly varying requirement, which is why we have tried to avoid the actual expense of construction of a federally owned building on a particular site.

Mr. MEADER. Do you happen to know whether you are going to change that traffic control center at Detroit Metropolitan Wayne County Airport?

Mr. THOMAS. Mr. Meader, there have been some site surveys and I am not sure where we have selected locations. I do believe though that there are other locations under consideration.

Do you know?

Mr. TIPPETS. I don't know precisely either. We will have to find out and let you know. We have made a survey.

Mr. THOMAS. One of the problems we are looking to is radio active fallout and maximum protection. We are trying to achieve the maximum protection of these buildings. They are not blastproof but we have taken some protective steps; and there is radiation washdown on them and there is a protective belt around the control quarters. We are trying to get them out of possible target areas. This would lead me to believe we'd want them further on the outskirts.

Mr. MEADER. For the most part, you are now located at airports, are you not?

Mr. THOMAS. Essentially.

Mr. MEADER. Now, you policy will be to move away from the airports?

Mr. THOMAS. For dispersal——

Mr. MEADER. There is not any advantage in being located in the vicinity of the airport?

Mr. THOMAS. There are some advantages but we feel overall for continuity of service that we would gain more advantages by being located some distance out from possible target areas.

Mr. PYLE. Protection of the personnel is a very important point.

Mr. THOMAS. This operation must go on in case of attack, a short or a long war. We simply must have this protection for defense forces, for our striking forces, to get the nonessential traffic out of the area

and keep the essential traffic moving. So this is one of the large factors in our decision.

Mr. MEADER. You have not made any estimate of what the total cost of such a relocation program would be, have you?

Mr. TIPPETS. The buildings themselves will run about a million or a million and a half to construct.

Mr. MEADER. You mean 26 buildings or just one?

Mr. TIPPETS. No; one building will run about this much.

Mr. MEADER. And you expect to have 26 when you are through?

Mr. TIPPETS. Yes, sir. The electronic equipment that goes into it—computers, radars, and so forth—will run between three and four million dollars and we will have operating from these quarters, in some cases, as many as 150 to 175 people who are watch standing controllers around the clock. These are rather sizable installations both important to military and civil flying. As I mentioned, this is the nerve center of our whole system.

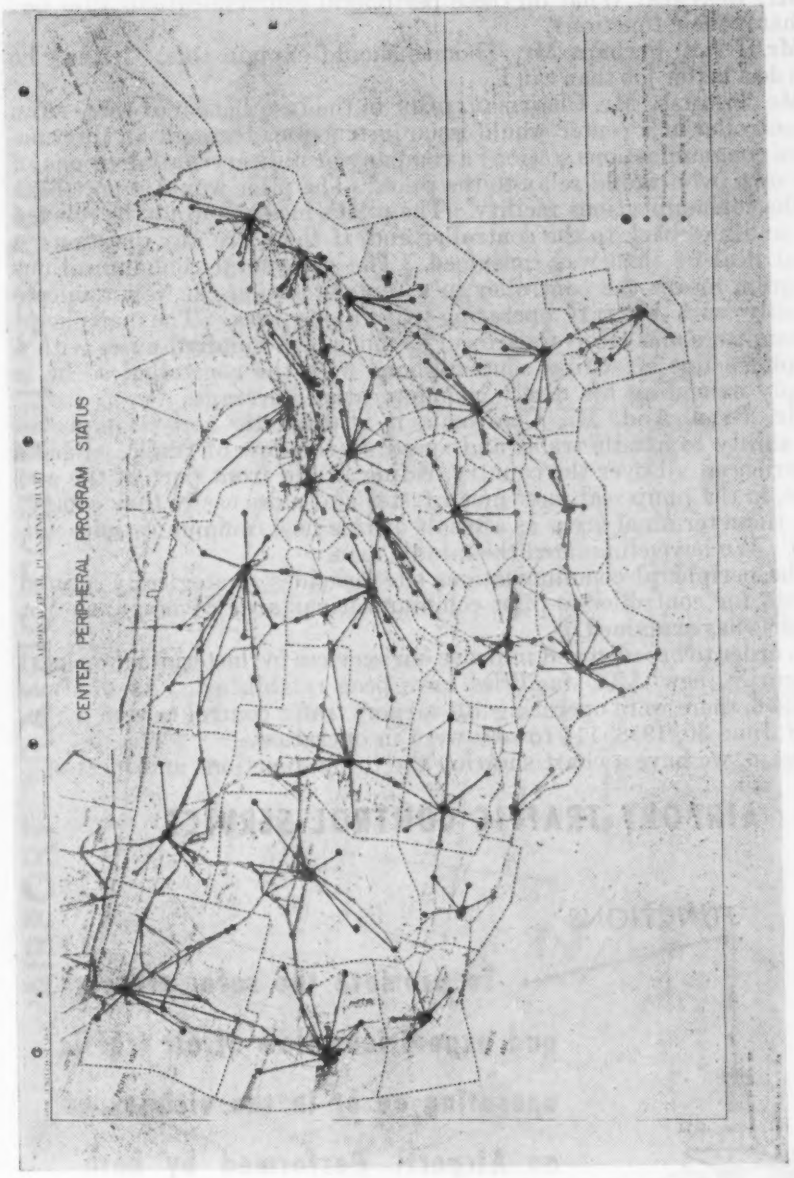
Mr. MEADER. That is all I have.

Mr. PYLE. May I proceed with my statement, Mr. Chairman?

Mr. BLATNIK. You may continue, Mr. Pyle.

Mr. PYLE. This will be accomplished by expanding the present center building to meet the new building specifications at San Antonio, while new buildings are planned for 10 other locations—Indianapolis, Atlanta, Chicago, Kansas City, Fort Worth, Cleveland, Albuquerque, Oakland, Minneapolis, and Jacksonville. Relocation of these centers in new buildings should be completed during the next 2 years. In the new center building we plan to provide the latest and most modern equipment for the ATC system; that is, long range radar, communications—landline and controller-to-pilot—improved operating positions, computers, and so forth, plus adequate space for training functions, personnel facilities and administrative facilities. The new center building, equipped with the most modern equipment, should represent one of our biggest steps of modernizing the en route control functions of our system.

The improvements made in the controller-to-pilot communications area can be best described by pointing out that one peripheral communications site was established to serve a center as of June 30, 1956; as of March 31, 1958, there were 197 peripheral communications sites established. And we have a chart which shows the location of these sites and how they are tied into the center location.


CENTER PERIPHERAL PROGRAM STATUS

Mr. HARVEY. The large dot is the center location. The small dot indicates the peripheral sites for communications above 27,000 feet and a little below 27,000 feet. And it shows the number that have been established in the last two years.

Mr. BLATNIK. What do these peripheral communications sites do? What is their function?

Mr. PYLE. Perhaps Mr. Thomas should explain this. I think he can do a better job than can I.

Mr. THOMAS. Mr. Chairman, prior to the installation of these sites, a controller at a center would issue instructions through an intermediate communications station; a company or military station or one of our own, who would relay to the pilot. The pilot would report back to the communications facility. The pilot's message would be relayed by landlines back to the controller and, if there are any questions, a great deal of time was consumed. The peripheral communications program means the controller in a center location can communicate directly with aircraft operating within his area. The peripheral transmitters and receivers are out as much as a hundred miles with a telephone line attaching a microphone with the controller, so he is simply extending his direct communication coverage.

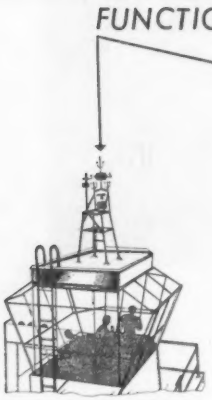
Mr. PYLE. And, Mr. Chairman, it is dramatic how it improves the ability to handle traffic and speed up the flow of traffic. I have experienced all over the country, riding in the front part of the airliner, in the jump seat, how much faster and more easily they can get into these terminal areas as a result of this new communications concept. We have eliminated the middle man.

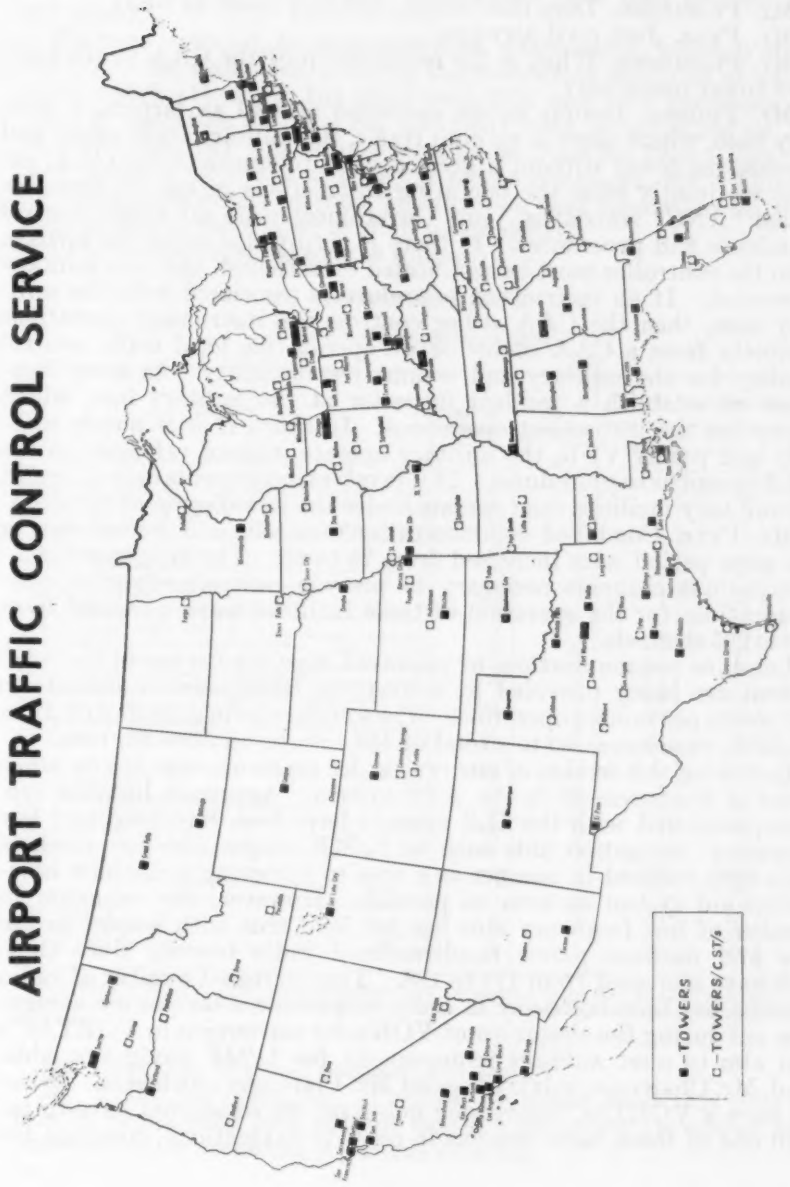
The peripheral communications site provides strategically located outlets for controller-to-pilot communications area coverage, as Mr. Thomas has explained.

In order to broaden and improve our services in the terminal or local categories, new ATC facilities have been established. As of June 30, 1956, there were operating 101 airport traffic control towers while, as of June 30, 1958, 114 towers were in operation.

Again, we have a chart showing the tower functions and locations.

AIRPORT TRAFFIC CONTROL SERVICE


FUNCTIONS
To promote the safe, orderly and expeditious flow of air traffic operating on or in the vicinity of an Airport. Performed by both Towers and CS/T's. CS/T's also perform the functions of ATC Stations


AIRPORT TRAFFIC CONTROL SERVICE
■-TOWERS
□-TOWERS/CSTs

Mr. HARVEY. These are the tower locations as of the end of calendar year 1957. The square solid indicates the towers, the open square indicates the towers combined with stations where we combine the communications station with the tower in order to get the lower activity.

Mr. PLAPINGER. Does this include military bases as well?

Mr. PYLE. Just civil airways.

Mr. PLAPINGER. What is the relationship of the CAA to the military tower operation?

Mr. THOMAS. Insofar as the operation around an airport, a military base, where there is no civil traffic, the military staff, equip and operate the tower without a great deal of reference to the CAA, except we jointly issue the operating instructions in our uniform so-called "ANC" standards, joint Government-wide air traffic control standards and procedures. If there is civil traffic using the airbase, then the controller must be certificated even though they are military personnel. If an instrument procedure is associated with the military base, then the CAA either controls the instrument operations remotely from a CAA center or we operate the local traffic control facility for the military and assume responsibility. In some locations we establish a resident inspector at the military base which supervises the instrument operations. In short, if it is purely military and purely VFR, the military operate without reference to the CAA except as to procedures. If it involves instruments or civil traffic, the military facilities then operate under the jurisdiction of the CAA.

Mr. PYLE. Combined communications stations and towers during the same period were increased from 76 to 85. The air-ground communications channels necessary to provide controller-to-pilot communications for the operation of these facilities were increased from 253 to 295 channels.

Landline communications of improved capacity for use in the ATC system are being provided by converting teletypewriter circuits to 100 words per minute operation. The 210 circuits in existence on June 30, 1956, were increased to a total of 446 circuits on June 30, 1958.

In closing this section of our review, let me summarize briefly other areas of improvement in the ATC system. Approach lighting systems associated with the ILS systems have been improved and low frequency navigation aids such as L/MF ranges and fan markers have been reduced in number as a step to achieving a common navigation aid system as soon as possible. However, the reduction in number of low frequency aids has not held true with respect to the low and medium power nondirectional radio beacons since these aids have increased from 179 to 188. This increased number of radio beacons has been necessary in order to provide a temporary navigation aid during the shutdown of VOR's for conversion to VORTAC's and also to meet military requirements for L/MF navigation aids. And, Mr. Chairman, this is the point Mr. Plapinger touched on. When we have a VORTAC conversion going on, we sometimes have to install one of these radio beacons to provide navigational coverage for

aircraft flying overhead during the process. So we do have some cases where we use more of them than we did in 1956. The airway beacon lights, which served the airway system as visual aids for many years, are being decommissioned and these lights have been reduced from 837 to 460.

We have included, for easy reference, a tabulation, which is attachment 1 to the statement, showing the number of facilities of various types which (1) are in the fiscal year 1957 and 1958 programs; (2) were in operation on June 30, 1956; (3) were in operation on June 30, 1958; and (4) will be in operation on June 30, 1959. Now, that is, I think, a two-page attachment to the statement, Mr. Chairman. Perhaps there might be some questions on that tabulation, so I'd be glad to answer them now; or shall we proceed?

(The matter referred to is as follows:)

ATTACHMENT No. 1[1]

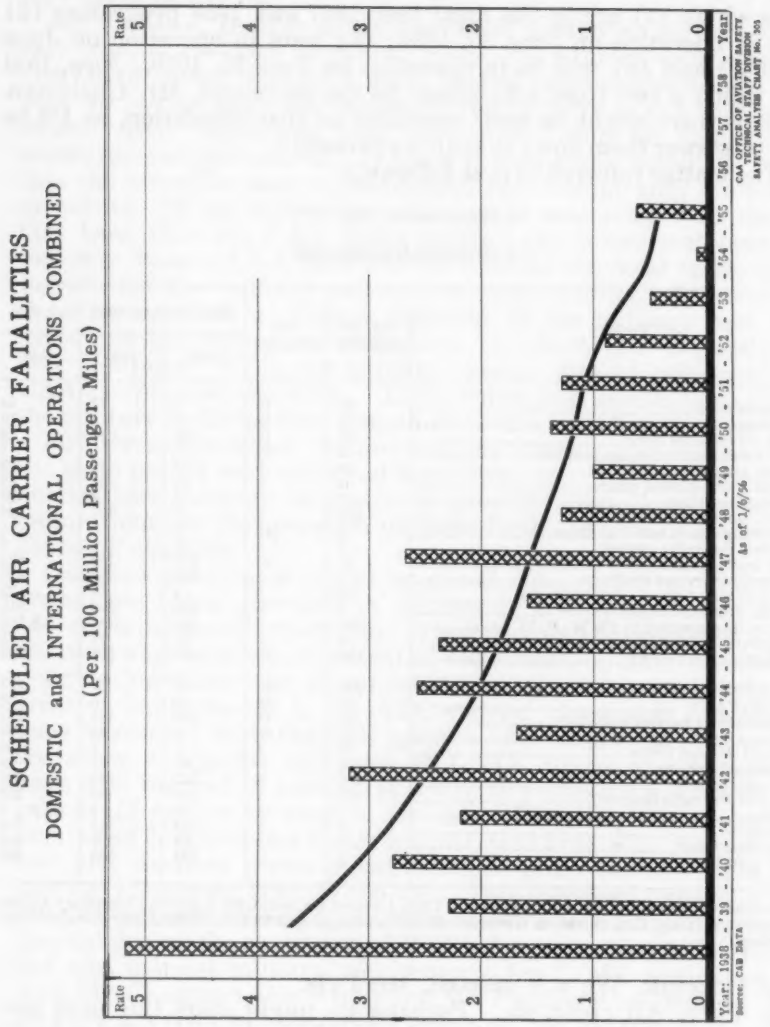
Facility implementation

Facility	1957–58 program	1959 program	Total in operation, June 30—		
			1956	1958	1959
Long-range radar	40	16	1	13	40
Radar beacons	22	42	0	2	12
Airport surveillance radar	27	19	35	45	48
Airport surface detection equipment	2	10	0	1	1
Precision approach radar	14	0	10	10	23
Air route traffic control centers	4	0	31	34	35
Add radar operation	28	0	1	4	29
Remote communication sites	323	0	1	197	324
Center expansion in new buildings	2	12	0	0	1
Computers for traffic control	3	5	0	1	3
Airport traffic control tower service	44	23	177	199	221
Additional air/ground channels	177	3	253	295	430
Radar approach control (civil/military)	24	0	5	15	29
Air traffic communication stations	0	0	360	350	318
Wire circuits converted to 100 W. P. M	906	0	210	446	1,116
International ATC stations	0	0	11	11	11
VHF omniranges (VOR)	136	13	431	552	580
Add TACAN to VOR	299	150	0	27	222
New VORTAC's	47	63	0	0	36
ILS (instrument landing systems)	37	19	158	169	170
Standard approach lighting	81	68	8	33	63
Sequenced flashing lights	34	7	1	4	35
Nonstandard systems	0	0	93	77	28
L/MF radio ranges	0	0	343	332	332
L/MF NDB's (radio beacons)	13	4	185	195	202
Consolans	4	1	0	2	5
Fan markers	0	0	224	214	218
Intermediate fields	0	0	109	102	102
Airway light beacons	0	0	837	460	460

[1] Statement of James T. Pyle, Administrator of Civil Aeronautics, before the Legal and Monetary Affairs Subcommittee, House Committee on Government Operations, at hearings on Federal Government's role in aviation.

Mr. BLATNIK. We will proceed, Mr. Pyle.

Mr. PYLE. All right, sir. Perhaps we might start this next section by just a brief look at these charts which show air carrier facilities and major accidents in general aviation.


SCHEDULED AIR CARRIER FATALITIES
DOMESTIC and INTERNATIONAL OPERATIONS COMBINED
(Per 100 Million Passenger Miles)
Rate
5
4
3
2
1
0
Year: 1938 - '39 - '40 - '41 - '42 - '43 - '44 - '45 - '46 - '47 - '48 - '49 - '50 - '51 - '52 - '53 - '54 - '55 - '56 - '57 - '58 - Year
Source: CAB DATA
As of 1/6/59
CAA OFFICE OF AVIATION SAFETY
TECHNICAL STAFF DIVISION
SAFETY ANALYSIS CHART No. 103

Mr. HARVEY. This chart shows the number of passenger fatalities per 100 million passenger-miles. It is a common index to all forms of transportation. It shows the rate in 1938 was over five fatilities per 100 million passenger-miles. The important thing is that, since 1952, that rate has been well below one. By way of comparison, we have figures for 1956. The rate was 2.7 in automobiles, 0.16 in buses, 0.20 in trains, and 0.21 for air in 1957. So the actual fatality rate in air transportation is exceedingly good and compares most favorably with other forms of transportation.

Mr. PYLE. I might mention, Mr. Chairman, before we get into this next chart, that we just ran some quick figures during the lunch hour and in a 10-year period from 1948 through 1957 there were 364,080 people killed in automobiles. In a comparable period, 892 people were killed in air carrier accidents.

(The information is as follows:)

Comparison of automobile and domestic scheduled air carrier fatalities

	Auto	Air carrier
Deaths per year:		
1957	39,600	[1] 31
1956	39,000	143
1955	38,426	156
1954	35,586	16
1953	37,955	86
1952	37,794	46
1951	36,996	142
1950	34,763	96
1949	31,701	93
1948	32,250	83
10-year total	364,080	892
Deaths over Memorial Day weekends:		
1958 (3 days)	371	0
1957 (4 days)	408	0

[1] Not counting 1 fatality by suicide by exploding dynamite cap.

NOTE.—Auto death rate in 1956 per 100 million miles of travel was 6.4. Domestic scheduled air carrier death rate in 1956 per 100 million passenger miles was 0.6. In 1957 it was 0.1. In 1957 there were 26,252,338,000 passenger-miles of travel. Auto injuries in 1957 totaled 1,400,000. Auto deaths (monthly average), 3,300.

Sources: Mr. Davis, AAA; Mr. Ashmead, CAB; Mrs. Hile, CAB; AP Library.

Mr. PLAPINGER. In how many years?

Mr. PYLE. Ten.

Mr. BLATNIK. 892 people?

Mr. PYLE. Yes.

I would also like to point out that, on 2 Memorial Day weekends, there were something like 978, I believe, who were killed in automobile accidents—in two 3-day periods—as against 892 people killed in 10 years in aircraft accidents. Now, this is a pretty good record, in other words.

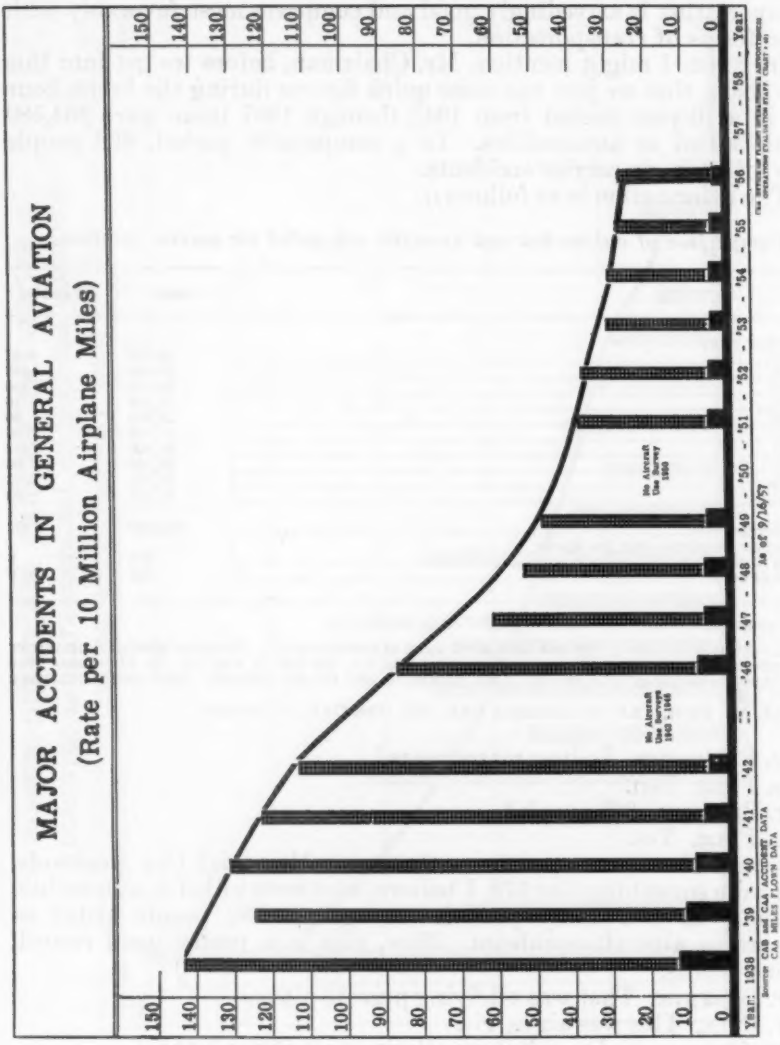
Mr. BLATNIK. That was all flying private planes——

Mr. PYLE. This was air carrier.

Mrs. GRIFFITHS. Doesn't it greatly increase if you put all——

Mr. PYLE. Well, we have the general aviation, too, Mrs. Griffiths.

Mr. HARVEY. Major accidents in general aviation have improved remarkably since 1938, but the rate of decrease is not as favorable and the number of fatalities would be larger.


MAJOR ACCIDENTS IN GENERAL AVIATION
(Rate per 10 Million Airplane Miles)
150
140
130
120
110
100
90
80
70
60
50
40
30
20
10
0
Year: 1938 - '39 - '40 - '41 - '42 - '46 - '47 - '48 - '49 - '50 - '51 - '52 - '53 - '54 - '55 - '56 - '57 - '58 - Year
No Aircraft Use Survey 1943 - 1945
No Aircraft Use Survey 1960
As of 9/14/57

Mr. MEADER. Now, that is exclusive of the commercial carriers?

Mr. HARVEY. That's right; this is general aviation.

Mr. PYLE. I'd like to point out in this connection that this is an area that concerns us greatly, and we are working with the general-aviation groups to improve this. Our inspectors—we are trying to reinforce the handling of this area through a better staff of inspectors, a bigger staff of inspectors, and a better program. This is the area, for instance, where the twin is operating, where the air taxis are operating, as you mentioned this morning, and we feel this will be of assistance in cutting down this accident rate by a little closer supervision. This is a very important part of our program; Mr. Keeley's department——

Mr. PLAPINGER. This is in airplane miles?

Mr. PYLE. That's right.

Mr. PLAPINGER. The domestic carrier per passenger-mile; is that correct?

Mr. HARVEY. There is no passenger-mile figure available.

Mr. PLAPINGER. How about the accident rate for airplane miles for commercial carriers; how does that compare?

Mr. HARVEY. It would be much better than this.

(The information is as follows:)

The major accident statistics between general aviation and domestic air carriers for the years 1955, 1956, and 1957, based on major accidents per 10 million plane-miles, are as follows:

Year	General	Air carrier (domestic)
1955	28.5	0.12
1956	26.7	.06
1957	28.0	.04

Mr. MINSHALL. You have made your checkout requirements for commercial pilots more stringent in the last month or two, Mr. Pyle?

Mr. PYLE. Yes, we have, working with the Civil Aeronautics Board working in this area on the promulgation of regulations. Would you like a brief description of this area?

Mr. MINSHALL. Very brief.

Mr. PYLE. Mr. Minshall was interested in the tightening up of private pilot requirements, Mr. Keeley.

Mr. KEELEY. We have taken the steps that correspond with proposed regulations, some which have been pending and they have worked hard to put into effect, that will require the flight instructors to renew their certificates so we can then continue to determine the present-day competency of our instructors. We have made a considerable study and have trained a number of our people and desk handling our liaison work and educational work with the various schools and organizations in the general flying field. We have worked very closely with the

industry, and many of the associations are working toward the establishment of safety clinics in each of the States. And, of course, we continue to press in all directions which come to our attention where air safety can be effective. Not only toward the lowering of the accident rate, but improving the time of instruction that they will receive, and included in that are the regulations that are pending before the Board now. I am not sure they have been adopted, whereby students will be required to take 5 hours of instrument instructions during their early training.

Mr. PYLE. I will proceed then with the statement, Mr. Chairman.

The extent and effectiveness of the safety rules recently promulgated as a result of the Maryland and Las Vegas crashes. In cooperation with civil and military users of the airspace and pursuant to a special civil air regulation adopted by the Civil Aeronautics Board, the CAA has participated in the development and has implemented the initial step of a positive traffic-control program. This step, which was effective June 15, 1958, provides for positive control of all aircraft at altitudes of 17,000 to 22,000 feet, mean sea level, inclusive, on specified transcontinental routes between New York, N. Y., and San Francisco, Calif., and between New York, N. Y., and Los Angeles, Calif., and between Chicago, Ill., and Washington, D. C.

Now, Mr. Harvey has a chart which shows the location of these positive-control areas. They are the ones that are delineated with heavy lines. I might say, by word of commendation to both the military and civil users and the CAB, that this was an accelerated program and was very effective. A special rule that was issued is ample evidence of the type of cooperation that all of us enjoyed in getting this job done. This, normally, would have taken as much as 6 months, and we did it in about 8 weeks. While it is too early to accurately determine the results of this rule, we are convinced that it has effectively increased the safety of our air traffic in these areas, as there are no visual-flight-rule flights at the specified altitude levels. Expansion of the program is planned as air-traffic-control capabilities improve.

In addition, an agreement was reached between the CAA and the military on the use of instrument flight rules which we believe will materially enhance safety and reduce the aircraft-collision hazard. A press-release copy of such agreement is included. And I believe there is an attachment to this statement here. This merely describes the program, Mr. Chairman, and we would like to submit that for the record.

Mr. BLATNIK. Without objection, so ordered.

(The document above referred to reads as follows:)

[United States Department of Commerce, Civil Aeronautics Administration, June 26, 1958]

CAA ANNOUNCES AGREEMENT ON USE OF INSTRUMENT FLIGHT RULES

WASHINGTON.—The Civil Aeronautics Administration announced today that the programs of the airlines and the military services to increase their participation in instrument flight rule (IFR) operations have been coordinated and agreed upon so as to provide maximum and equitable use of the present capacity of the CAA air traffic control system.

The military services at the present time contribute 42 percent of the IFR operations controlled by the CAA air traffic control system. Both the airlines and the military have expressed their desire to make maximum use of full IFR in controlled airspace, including climbs and descents between the airport and cruising altitude by both jet and conventional aircraft. Previous military self-

imposed IFR flight policies had affected only jet aircraft. This new military policy includes all types of military aircraft which would create a greater degree of protection between those users participating in the system. This, coupled with the airline plan to use IFR service on all flights above 10,000 feet, except for climb and descent under certain circumstances, would have imposed a demand on the system that could not have been accepted under present capacity without severe delays to all users of the airspace.

In coordinating these programs, the CAA felt it necessary at this time to request the military services to defer maximum use of full IFR climbs and descents, as well as to refrain from a policy of requiring full en route IFR operations by conventional aircraft below 10,000 feet. The deferment of maximum IFR operations will be, in part, compensated for by concerted attention to provide better departure and approach arrangements for military airbases and airports on which military units are based. In some cases, this will require a modification of jet penetrations, approach and departure procedures, and/or airway structure at these locations.

The area in which their respective programs could best be brought in consonance for the benefit of all was between the altitudes of 10,000 and 20,000 feet. Therefore, the airline and military policies for increased IFR operations will be essentially the same as they pertain to en route flight along airways and in controlled airspace at and between these altitudes. The airline policy will apply at higher altitudes also, where the military already utilize IFR flight plans to a large extent.

There will be times, with good weather prevailing, when IFR flight plan clearance delays will be unacceptable to the flight mission involved. Under such circumstances, pilots still have the prerogative of requesting visual flight rule (VFR) provisions as determined by company or military policy, except on positive control airways.

Mr. PLAPINGER. This refers to airlines planning to use IFR service on all flights above 10,000 feet. What specifically has the military agreed to do here, Mr. Pyle?

Mr. PYLE. Well, Mr. Thomas can perhaps better explain this. He is more familiar with the details.

Mr. THOMAS. The general agreement and plan between the military and the air carriers and, I believe, the business aricraft as well, is that they are to operate under instrument flight rules in the areas between 10,000 feet and 20,000 feet. This is the area of agreement. Actually there are more instrument flight rules operations being conducted than that by all users both military and civil, inasmuch as it is still the pilot's option, if he desires, to operate on instrument flight rules at any time he chooses. But essentially the effect of this is, instead of each individual user having his own separate program, the users got together and came out with a uniform program of operating under IFR between 10,000 and 20,000 feet.

Mr. PYLE. Now, there have been other safety measures designed to prevent reoccurrence of air crashes.

Mr. PLAPINGER. May I ask this question. If you recall, at the time of the Maryland crash there was a lot of talk about 5 points and the 5 points were indicated in news items, as pertaining to jet training aircraft and military jet penetrations and unscheduled cross-country hops. Have any of those items been incorporated in any of the procedures prescribed since the Maryland crash?

Mr. THOMAS. Mr. Chairman, Mr. Plapinger, I think they might be somewhat difficult to identify the various actions specifically with those five points. There were a great number of emergency special regulations put in—not air traffic rules or civil air regulations—but by the military immediately following the Brunswick accident and in compliance with the five points. For example, for a few days, all

military flights in and out of Washington were placed on IFR. There were certain restrictions placed on all military jet flying—that is, those operating below 20,000 feet had to be on IFR. Some military bases completely suspended flying until we could meet with them and work out arrival and departure corridors. We have established joint teams with both the Air Force and the Navy to make a base by base and a procedure by procedure survey. So I think it would be somewhat difficult to relate all of these to the five points, but they were all intended to meet the objective of the President's program in this regard.

Mr. PLAPINGER. Well, now, are training flights piloted by military students on civil airways required to operate on IFR?

Mr. THOMAS. If they operate in jet aircraft below 20,000 feet, they are required to do so.

Mr. PLAPINGER. You mean between 10,000 and 20,000 feet?

Mr. THOMAS. No; below 20,000. This is just below 20,000 feet. Now, there are exceptions for this. For example, this rule actually caused suspension of some operations. For example, flame-out practice in a jet trainer requires some six or seven thousand feet of altitude right over the field. It's a little ridiculous to meet the legal meaning of the rule to climb up to 20,000 feet to come back down to practice a flameout.

And also it wasn't too practical to follow IFR just to go around in a traffic pattern. So we worked out special provisions; for example, for flameout practice, when this is going on, other IFR traffic is routed above that altitude. We have established some civil frequencies in military towers so that the civil pilots can contact military towers and find out about their traffic patterns.

Mr. PLAPINGER. Are military jet training penetrations from high to low altitude required to be off civilian airways?

Mr. THOMAS. No, sir, they are not; and we have reviewed many hundreds of these.

Mr. MINSHALL. What was that last question? Would you repeat it?

Mr. PLAPINGER. Are military jet training penetrations from high to low alutitudes required to be off civilian airways.

Mr. THOMAS. The matter of fact is this is done to the extent possible; yes. Now, in some cases the initial approach altitude was 20,000 feet. This may be raised to twenty-three or twenty-five thousand feet to get them above the normal civil operating level. But those navigation aids which are available for jet penetration are the same as those which form the airway. So it becomes actually physically impossible to segregate jet penetrators from the airways. In some cases we have the penetration essentially off the airway but it must eventually get back on the airway to arrive at the base. In some cases they do this below the normal minimum en route altitude, the minimum altitude for instrument traffic. But I think, generally, it is almost impossible for jets to climb and descend and not traverse the civil airways. We may refer back to the airway chart of how much airspace is consumed by airways.

Mr. MINSHALL. But many of the circumstances which, presumably, caused the Brunswick crash have been overcome, have they not, as a result of these emergency rules that you have adopted?

Mr. THOMAS. Yes, sir. I would say both the military and civil have been working night and day.

Mr. MINSHALL. In other words, the Maryland National Guard would no longer be permitted to make a flight under the circumstances they made it at the time of that crash; is that correct?

Mr. THOMAS. This was a jet flight at the lower levels, and is now prohibited by the military unless on IFR—now either at the higher levels or done IFR.

Mr. PYLE. In response to your statement, we have reduced to an absolute minimum everything possible. There is always going to be some exposure. We cannot completly deprive the military of their need for training. And what we have to do is to work with them in trying out ways and means to meet this requirement by reducing this exposure to other users of the airspace to a minimum. This is the position we have had to adopt.

I will continue, then, with the statment. The Civil Aeronautics Administration has spared no effort to insure safety in aviation. The full time and efforts of a large number of CAA personnel, both at headquarters and in the field, are continuously devoted to aviation safety. The methods and procedures utilized to make certain that appropriate measures are taken are technical and widely varied.

As an example, however, we have the following: Traffic separation. A few examples of some of the recent steps taken are as follows: Civil Air Regulation 60.10, which will become effective on August 15, 1958, will provide 500 feet separation for all traffic below 29,000 feet, and 1,000 feet separation for all traffic above 29,000 feet. Under this regulation, VFR aircraft will cruise at odd or even thousand feet, plus 500 feet, depending on direction of flight. Aircraft operating on an IFR flight plan would normally be conducted at odd or even thousand-foot levels, thereby normally providing at least 500 feet separation between VFR and IFR flights.

Mr. PLAPINGER. Now, in what respect is this a change, Mr. Pyle?

Mr. PYLE. I think you could probably explain that better than I, Dave.

Mr. THOMAS. Mr. Chairman and Mr. Plapinger, we are now operating under a quadrantal rule. Essentially, though, the difference is that now aircraft flying in the same airspace under IFR and VFR conditions operate at the same altitudes. The new rule would require the VFR and IFR aircraft to be separated by 500 feet. A great source of near misses is between the aircraft operating under the two types of flight rules, both legally, at the same altitude.

Mr. PYLE. In other words, to really make it simple, you intersperse them.

Additionally, a joint CAA-military-industry study was made and methods and procedures developed to segregate certain military-jet activities from civil users of the airspace whenever possible and to the extent practicable. This is being accomplished through an orderly review of military bases to distinguish between those operators adaptable to general air-traffic-control procedures from those which are not. Airspace is being made available for both types of operations by increasing control capability for the first and providing reserved airspace for the second. To date, even though the number of bases reviewed are relatively few, the results are gratifying. While individual procedures applied may invoke some penalties on all users, the prime objective is obtained to a limited degree. Where the airspace users intermingle, arrangements are being made to pro-

vide for the exchange of traffic information. This, in itself, is a significant accomplishment.

Mr. PLAPINGER. What does that mean, Mr. Pyle?

Mr. PYLE. This, in essence, Mr. Plapinger, is advising the pilots of both aircraft that they are, maybe, on a converging course, they are in the same area. For instance, I think, when we went up on the aircraft, you heard the radar controller advising us there is traffic at 2 o'clock 1 mile away. Now, this means that a mile away there is traffic we should try and spot with our eyes. This is traffic information. Now, it can take other forms, too.

Mr. PLAPINGER. You mean heretofore this has not been done?

Mr. PYLE. Perhaps you could explain that, Dave.

Mr. THOMAS. In general, it has been done where we had radar facilities to do it, and such information has been given to those aircraft who were employing those radar facilities—which the average VFR pilot cannot. Therefore, even though there may have been equipment on the ground to provide this service, the VFR pilot was neither required to use the service—in fact not desired to use it due to the limitations on ground personnel. We are expanding on this service to include the VFR pilot, and I think Mr. Pyle will go into that a little bit more. But we are trying to get out other types of information. One example I gave is when we put in a civil frequency at Webb Air Force Base at Abilene. We are exchanging more information between the military and civil towers where the traffic patterns are in close proximity. In general, a very detailed and time-consuming program is underway of making more traffic information available to pilots.

Mr. PLAPINGER. Is there any requirement that would make it incumbent upon military bases operating in the vicinity of civilian airports to be cognizant of airline schedules in that area?

Mr. THOMAS. No, sir; there is no such requirement, and I doubt that it would be other than of general interest, due to the variety of altitudes and routes that might be used. Now, we usually arrange this and, I think, a little more simply, by traffic pattern and each would expect there would be airplanes in the other traffic pattern at all times.

Mr. PLAPINGER. I think I was thinking in terms of the Brunswick crash, where neither pilot knew the other was in the area.

Mr. THOMAS. When we get to that point, I think we are talking of complete, positive control and exchange of traffic information on the ground controllers. We are talking way beyond our capability at the present time when each pilot knows where each other pilot is in the area. I think that the mere knowledge on the part of the National Guard pilot that there were planes operating on the airway, which he should have had, and on the part of the airline pilot that there may be other planes in the same airspace, would not be too useful. Traffic information is useful if it is specific: "There is an airplane here." He is either on a collision course or not. You either take action or you don't take action. Generalized traffic information is not too helpful.

Mr. PLAPINGER. My recollection is that the same situation obtained at Nellis. The military base was not cognizant of the fact that there were civil airliners in the vicinity.

Mr. THOMAS. I think all the military pilots knew that there was heavy air-carrier activity on those airways. I think they never knew that specific flight went by there at that time every day. It was extremely doubtful where this would be valuable information. He may have been at a different altitude every day. He might be 5 minutes ahead or 5 minutes behind. There are alternate transcontinental routes. I think the base did have the generalized traffic information that it was a quite busy airway, and I think the airline pilots knew it was a busy military base, but neither of the pilots knew, specifically, of the presence of each other.

Mr. BLATNIK. We will call for a brief recess until I get my quorum call. I'm sorry to interrupt here.

(Whereupon, a short recess was taken.)

Mr. MEADER. I understand the chairman wanted to proceed even before he returned. I was not here where you left off, so I will have to depend upon you, Mr. Pyle.

Mr. PYLE. It is on page 14, Mr. Meader: "(b) Flight-test areas."

With respect to flight-test areas, regulations were also amended to require that flight testing of aircraft be conducted over open water or sparsely populated areas having very little air traffic and within a flight-test area prescribed by the Administrator. Many flight-test areas have been prescribed and are or will be adequately depicted on appropriate aeronautical charts.

Altimetry: Altimetry has long been a problem to the aircraft industry. Every effort is being made toward the development of a highly accurate instrument that may be used at all altitudes and under all conditions. On June 15, 1958, we implemented a program of providing pilots with current altimetry settings when in direct communication with air-route traffic-control facilities. In addition, we have been working closely with the Civil Aeronautics Board to establish a system whereby all pilots will use a standard altimetry setting when operating in the continental control area.

Mr. PLAPINGER. Mr. Pyle, what is being done to provide altimetry at the high altitudes?

Mr. PYLE. You mean, in other words, the information? More accurate information?

This is a constant program of research, Mr. Plapinger. Actually, there is a system now which, I believe, two companies have worked out, which is called an air-data system, and which is a little different from the present system. It is an electronic system and incorporates many computations, and so forth. It is accurate to within 200 feet, roughly, at 40,000, which is much more accurate than the present altimeter which is being used. Now, this is an expensive device. If I recall correctly, it is on the order of $10,000.

This, at the higher altitudes, does the job, however, and is important to us in that it saves altitudes.

We have to separate the aircraft by 2,000 feet at the higher altitudes as against 1,000 at the lower because of this altimetry error.

Mr. PLAPINGER. At what altitude do you being to separate at 2,000 feet?

Mr. THOMAS. 29,000. Anything above 29,000.

Mr. PYLE. So, this is actually now in being.

Mr. PLAPINGER. You say it is in being?

Mr. PYLE. It is in being. It is being flown; the C–135 and the new jets will all have them.

Mr. PLAPINGER. How about the commercial airliner?

Mr. PYLE. I am speaking—when I say the new jets, the commercial airlines, as far as I know, will all be so equipped. The continental control areas——

Mr. MEADER. Before you leave this altimeter business, I am not sure I know the details of this well enough to ask a question very clearly, but I understand there is an altimeter device which can be used in connection with altitudes at which planes should fly, depending upon the direction in which they are flying.

I understand now you have east-west traffic; flying east takes one altitude and going in the opposite direction—what?—1,000 feet separation?

Mr. PYLE. That is right.

Mr. MEADER. And then north-south you have some separation. I have forgotten; what is that, on the 500 marks?

Mr. THOMAS. No, sir, Mr. Meader. Under the new hemispheric rule, as we call it, everything generally east from north to 179°, actually south, will be odd thousands, and everything that is west will be at even thousands.

Now, the VFR traffic will follow the same rule plus 500 feet. So, this does mean that all traffic operating generally in an easterly direction, which can be almost north or almost south, will be at the same altitude. They can, of course, be crossing at those altitudes under visual flight rules.

I believe the system you describe would relate the proper altitude to the compass heading and divide the 2,000 feet into 360°, so you would fly increasingly higher as you turn to the right or increasingly lower as you turn to the left.

Mr. MEADER. So that the pilot could look at just one instrument and see what altitude was a safe altitude to fly?

Mr. THOMAS. Yes; this has been the proposal. We have had considerable difficulty with this proposal, however, and it has not been adopted.

One of the problems is that, in following an airway, it is much easier to fly at one assigned altitude than it would be by varying a few feet depending upon a few degrees variation of the compass heading. It would require a great deal of pilot attention just to correlate the altimeter and the compass heading to be sure that the proper altitude was being flown.

The altimetery inaccuracies that have been mentioned here before would defeat it, in part—not completely, but in part— and, further, there is no protection between the climbing and descending aircraft and aircraft in straight flight. It would offer some degree of protection.

So, in general, we feel there are so many complications in this system and require such a high degree of precision to make it accurate, both precision in altimeter and flight techniques, we would achieve better safety by a simpler system, the one that is being adopted.

Mr. PYLE. With respect to the continental control areas, in December 1957, the CAA designated the so-called continental control area which includes that airspace within the continental United

States at and above 24,000 feet mean sea level, exclusive of prohibited and restricted areas. Concurrently, procedures were developed and implemented for the control of IFR traffic operating in this area, and minimums for visual flight, VFR, were increased substantially. Added safety to IFR flight operations were achieved by increasing the separation of aircraft operating in this area.

As I previously mentioned, effective June 15, 1958, we designated a "positive-control segment," which is transcontinental portion of airspace between 17,000 and 22,000 feet having a width in excess of 40 miles. Full positive control is in effect in this segment.

Mr. PLAPINGER. Do I understand that above 24,000 you do not have full positive control, while between 17,000 and 22,000 you do? Is that right?

Mr. PYLE. Mr. Plapinger, we have it between 17,000 and 22,000, only on those bands 40 miles wide which are set forth on this chart.

Mr. PLAPINGER. Right.

Mr. PYLE. Now, it is our intention to expand these positive-control segments as fast as we can, with due regard to the requirements of the uses of the airspace and our capabilities. This is a problem, too; we cannot handle too many.

Mr. PLAPINGER. Is there any plan in being now to drop the 17,000-foot level to 15,000 feet?

Mr. PYLE. This is something that I think would be a little premature to say, Mr. Plapinger, at the moment. This requires extensive study with the users of the airspace. One of the big problems that we have in this area is the ability to get crossing traffic or traffic across these airways. Now, if we drop it too low, we inhibit a great many of the military training activities and make them have to comply with this system; right at the moment, it would be beyond our capabilities, and we cannot impose this additional hardship on the military.

Mr. PLAPINGER. The reason I ask the question is I believe, in jet-age planning No. 3, there was a proposal to drop this to 15,000 by the middle of the year.

Mr. PYLE. I think we are getting two points confused. We are talking about the lowering of the continental control area to 15,000 feet sometime later this year or the first of next year; right?

Mr. THOMAS. Yes.

Mr. PYLE. So the positive control segments of airways do not coincide except that they fall within the same airspace.

Mr. Thomas, I believe, has a correction to make for the record on the statement "Width of the airways."

Mr. THOMAS. Yes, sir.

The statement on the positive control airways in the airspace between 17,000 and 22,000 feet stated "a width in excess of forty miles"; this is a typographical error. The Board authorized us to establish widths up to 40 miles.

Mr. MEADER. What are the present airway widths?

Mr. THOMAS. At the present time, the airway widths are 10 miles. In the continental control area we use a triangular width depending upon the distance between facilities, we are using up to 30 miles for some of the route segments. We are using 40 miles for some route segments.

Mr. PYLE. Mr. Chairman, we are in the middle of page 15, paragraph (e), "Eliminating the assignment of VFR instructions to IFR flights."

On July 1, 1958, the CAA placed into effect a very significant change in IFR operating procedures whereby air traffic control personnel will not initiate the issuance of "VFR conditions" restrictions to IFR flights except at the specific request of the pilot. This is in keeping with the positive control concept and compatible with military and industry programs for full IFR operations.

Mr. PLAPINGER. What does this mean?

Mr. PYLE. I think Mr. Thomas can explain it better than I.

Mr. THOMAS. Mr. Plapinger, in the past, in fact up until July 1, if the pilot desired a cruising altitude of 19,000 feet and the 17,000-foot altitude was occupied, if the controller knew it was good weather, he would clear him to cruise at 19,000 feet but to climb from 15,000 to 19,000 through this occupied altitude under VFR conditions, meaning that when the pilot goes through, that he is going through on the see-and-be-seen rules.

Effective July 1 we took the initiative away from the controller. The pilot may still request VFR climbs and descents; when he gets up there and finds out there is traffic and sees it is good weather, he may request VFR rules clearances, but the controller may not initiate it.

We had felt that perhaps we were using VFR restrictions too much and encouraging pilots to use VFR by trying to expedite the traffic and having the pilots operate on the see-and-be-seen rules. This way the controller will no longer initiate such VFR instructions.

Mr. MINSHALL. Mr. Chairman, I discussed this at the time we had our hearing immediately following the Brunswick, Md., crash. Testimony that was given to us at that time by both the pilots and I believe representatives of your department indicated the see-and-be-seen theory was pretty much outmoded and discarded, shouldn't be used in any event.

Mr. THOMAS. Mr. Minshall, there has been a lot of testimony and a lot of thought in that direction, but I don't think it has been positively concluded as black and white. As far as I know, the human eyes are still the best anticollision device that has ever been invented. The eye still serves a useful purpose. Where the see-and-be-seen theory gets into trouble is with very high speeds and very high closure rates, but not under all circumstances.

I don't believe that either the CAA or the CAB, or the military services, or any other operator, has concluded that see and be seen is not still useful.

Mr. MINSHALL. Airline pilots ——

Mr. THOMAS. Some of the airline people have.

Mr. MEADER. Mr. Sayer said point blank before the committee that the see-and-be-seen theory is not a good one.

Mr. THOMAS. All I can say, sir, is they are still operating under it.

Mr. MINSHALL. In name only, not in practice. Unfortunately I believe that was the cause of some of our recent airline crashes.

Mr. PYLE. Mr. Chairman, if I may point out, whereas there are many points in favor of this point of view—namely, that the see and be seen is outmoded, and we subscribe to it, particularly in the

high-performance area—nevertheless the facts of life are that we have to keep these aircraft moving. We have to train these pilots. We have to get these airliners from here to here [indicating]. And until we can get the capability of doing this job by other means, we have to use, with descretion, the see-and-be-seen basis; or we just run into a hopeless logjam and will not move anything.

This is the area where we are trying to reduce our exposure. This is another area where this same problem comes up. We do not like to use it any more than we have to, but sometimes just to break the logjam it is a necessity. There is an exposure, let's face it; but, on the other hand, if we use it with descretion and controllers and the pilots are careful, this is a device that can move more traffic than if we have to strictly abide by the IFR rules, which would require extensive and extravagent use of the airspace. When we get radars, we can leave it.

Mr. MINSHALL. Has any further thought been given, Mr. Pyle, to the painting of aircraft bright colors?

Mr. PYLE. Yes, there has been a great deal of thought. We have standardized on a paint job using—I think it is called Day-glow Product, which is kind of fluorescent paint.

Mr. MINSHALL. Yes.

Mr. PYLE. We are painting every one of our aircraft with this distinctive type of paint to increase visual——

Mr. PLAPINGER. You mean every plane belonging to the CAA?

Mr. PYLE. Every one of the CAA aircraft, yes.

The pilots in general aviation, the business aircraft, have done extensive work on this. So have the military for their training aircraft, which are gradually being painted with this, both in the Air Force and, shortly, in the Navy.

There are some problems, however, with this paint. We must recognize it is not as lasting as other types of paint. We are trying to lick this problem. We feel if we put an extensive application, we will get more experience this way and maybe we will be more successful in licking the lasting qualities.

Mr. MINSHALL. Have the commercial airlines——

Mr. PYLE. They are working on this problem, too.

In fairness, they have expensive paint jobs in which they have spent a lot of money to get attractive designs. They feel until this paint concept is proved, they are not too willing to change right now. However, Northwest Airlines, for instance, has—if you remember—a distinctive red tail. They are experimenting with the red color of this paint and it is very effective.

Other airlines, Allegheny, has painted certain portions of their aircraft with this paint. Thought has been given to painting flaps and control services. So I think most of the airlines are working on this in some form or other.

United Air Lines has been in to talk to us on it.

Mr. MINSHALL. Have any of the airlines got beyond the talking stage on it? Have any of them attempted it? Has Northwest put it into practical operation?

Mr. PYLE. Allegheny, if you remember, on their tail have a red streak; they have painted that.

Mr. MINSHALL. You personally feel it will be a good idea, based on your many years of experience, if they all do it, do you not?

Mr. PYLE. High-density air-traffic zones, in keeping with a CAB safer it is.

Mr. MINSHALL. Thank you.

Mr. PYLE. High-density air-traffic zones, in keeping with a CAB rule adopted February 6, 1957, the CAA designated the area in the vicinity of certain airports, 15 in number, as high-density air-traffic zones. In such area, below 3,000 feet above the surface, certain speed and communication requirements must be adhered to by all aircraft. This was prompted by the fact that the terminal areas are the most susceptible to potential air crashes. By imposing speed, altitude, communications, and visibility restrictions, safety has been substantially increased.

Now, this section on radar traffic advisory service goes back to the point that we were mentioning initially, Mr. Plapinger.

Since June 23, 1958, the CAA, in cooperation with the CAB, has conducted an evaluation of VFR arrival and departure radar traffic advisory service in the Indianapolis, Ind., terminal area. This service is intended to aid the pilot in his visual surveillance by calling to his attention a specific direction in which radar indicates possible conflicting traffic to exist. The purpose of the evaluation is to determine the value of this service with proposed expansion, if deemed beneficial.

I think it might be appropriate to point out, Mr. Chairman, in the first place, we think this test is going to be successful. We anticipate it will, shortly, be expanded. However, it does require certain additional equipment in the tower task, specifically, daylight radar tool.

I think it also might be appropriate to point out, in connection with the advisory service, our philosophy is to use any tool that is available, and take the last little bit of use out of it in the interest of safety. Radar is one of these tools. If we can use it for VFR traffic advisory, we are going to do so.

Now, the problem that we had before us is to be sure that the procedures and the techniques we use are practical, and this is the purpose of this Indianapolis test.

With respect to anticollision devices——

Mr. PLAPINGER. Excuse me.

Mr. PYLE. Yes.

Mr. PLAPINGER. In connection with your evaluation, it would seem to me, possibly, that it is self-evident that it would be an important safety factor to advise a pilot of possible conflicting traffic in the area. What form does your evaluation of this test take?

Mr. PYLE. Well, Mr. Thomas may want to add to the comment I will make. There are several problems involved, however, Mr. Plapinger. One is the communication requirements for the aircraft that get into the system that must comply or form a part of the system; what frequencies are we to use——

Mr. PLAPINGER. You are talking about procedures. There is no doubt in your mind but this is valuable information and should be gotten to the pilot? What you are telling me now is there are procedures to be worked out?

Mr. PYLE. That is right. We are evaluating the procedures and techniques we use to be sure they are safe. We could have a radar

assisted collision, if we do not do it right. This, we do not want to have.

Mr. Thomas points out that we are actually having, in addition to our evaluation, the pilots themselves comment by the use of post cards, which they pick up as to: "How is this?" Does it help you?" And so forth. They give their reaction to the system. This is extremely useful.

We can do a better job. We will probably have to set up, for instance, routes, patterns, traffic patterns entering the area, to be sure that we can get maximum use out of this new procedure.

Mr. MEADER. Now, do I understand that that is only in the holding area of an airport?

Mr. PYLE. This would be in the vicinity of the airport itself, Mr. Meader. In other words, what we are trying to do, basically, is to enable the controller to see not only just maybe 5 or 6 miles, which he can do with his human eye in good weather conditions; we want him to see out 15 or 20 miles by use of a radar and to advise the pilot, "You have a fellow 2 o'clock; watch out for him. We do not know the altitude, but there he is." This enables a pilot to scan maybe a small segment of the pie and pick out his traffic. It is an extremely useful device.

Mr. MEADER. This is intended to operate beyond the point where planes are approaching for a landing, and they are under control tower anyway?

Mr. PYLE. It extends that area further out; that is really what we are doing.

Mr. MEADER. I mean, when approaching for a landing, they are under control-tower directions anyway, are they not?

Mr. PYLE. That is right; we want to get them under control a little further out, to extend their safety.

Mr. MEADER. Simply to notify him, maybe, "You have a plane in back of you 10 or 15 miles heading in your direction; look out for him"?

Mr. PYLE. That is right. We also find, as a byproduct of this, we can space our aircraft and get more efficient use of the runway by the use of radar. We can do much better than we can if we just depend on the human eye.

We also find pilots reporting 10 miles out are actually 15 miles out. They think they can get in a little quicker that way. We catch up with them that way.

Shall I proceed, Mr. Chairman?

Mr. BLATNIK. Please.

Mr. PYLE. Anticollision devices: Considerable effort is being made to develop an anticollision device, but progress is slow due to the many technical problems involved. Despite this, however, many people are working on their solution. Aerojet-General Corp. has developed a system based upon infrared detection from other aircraft. In the present state of development, the infrared equipment is more of a proximity warning system than an anticollision device, and there are some weather conditions in which its operation is adversely affected. The system is nearing completion, and we are hopeful that it may be perfected.

I might say, in this connection, the Airways Modernization Board has undertaken an intensive review of all the work done in the de-

velopment of anticollision devices. That agency has given the development of anticollision devices a high priority and is actively engaged in following all developments in this field in an effort to secure the earliest possible completion of a satisfactory device.

I might add that both the Air Transport Association and the Association of Airlines and the Air Forces have done a lot of work in this area, all of which information has been turned over to the Airways Modernization Board.

In connection with the anticollision problem, generally, we have called this matter to the personal attention of the presidents of all the airlines and the major military commands operating aircraft. We are also continually publicizing and directing the attention of pilots to the risk of collision by the use of pictures and cartoons on the cover of Airman's Guide, which is one of our publications all aircraft use, and other appropriate locations.

Airport separation: The separation of airports, using a standard set of distances, has been a topic for study and is a part of the Curtis report. This matter has also been studied by the Department of Defense and the Technical Development Center at Indianapolis. After careful consideration of all of the available facts, we have reached the conclusion that airport separation by specified distances, established as a set of standards, is not a valid approach, in that such distances cannot be set down to effectively cover all ramifications that become involved when siting airports.

The specifications of airports must vary in order to meet the specific problems encountered at a particular location; that is, airport size and configuration, type and volume of traffic that will be handled, and the relationship of the traffic patterns associated with each airport.

The airport size and configuration is dependent upon the type of traffic that will be handled and the maneuvering characteristics and speeds of the aircraft involved. The larger and faster aircraft must be provided traffic patterns of sufficient size wherein operation can be safely conducted.

As the traffic pattern is extended for the larger and faster aircraft, it is necessary that more distance be provided between airports located in a terminal complex. The traffic flow, whether traffic patterns and approach procedures are parallel or converging, dictates distances that must be used when siting more than one airport. These examples are used only to point out a few of the considerations that make the establishment of a standard criteria for siting airports impracticable.

Mr. MEADER. Mr. Chairman, may I ask a question?

Mr. BLATNIK. Mr. Meader.

Mr. MEADER. You did have criteria in 1949, Mr. Pyle, did you not, on separation of major airports?

Mr. THOMAS. Mr. Chairman and Mr. Meader, I do not recall having a specific mileage criteria in 1949. There have been a number of studies that have been made by a number of agencies and there have been some mileage figures proposed.

The Curtis report did contain in it a recommendation that airports be located 16 miles apart when the runways were not in line with each other and, I believe, 40 miles apart when the runways were in line with each other, or on this order.

They also went on and stated that each individual location needed to be studied.

The usual conclusion—and there have been many of these studies, and the one to which we subscribe—is that you have to individually study the arrival routes, the departure routes, the speeds of the aircraft that would use the 2 airports; the directions of the major runways of the 2 airports, whether or not they are parallel, converging, or not; and then work out a separation based on the individual geography.

Mr. MEADER. Mr. Thomas and Mr. Pyle, I called your attention at our earlier hearing after the Brunswick, Md., crash to testimony which I think starts about page 380, at the top of page 380 and continues for 2 or 3 pages of our hearings of June and July 1956. In substance, Mr. Lowen, who was then the Civil Aeronautics Administrator, advised the committee that the Civil Aeronautics Administration was in the process of making a study of holding and approach pattern at airports which would be expected when jet aircraft would be used commercially. He said that the Civil Aeronautics Administration had a couple of planes that they were experimenting with and that he anticipated that that study would be completed in 6 months—which has now been a year and a half since the study should have been completed and when CAA would know the answer as to whether or not when jet commercial planes came into general use it would be desirable to have major airports located at greater distances from each other than is desirable with propeller aircraft.

Now the closest you come in your statement to indicating the results of any such study is the sentence on the top of page 18, "As the traffic pattern is extended for the larger and faster aircraft, it is necessary that more distance be provided between airports located in a terminal complex."

Now, that is very general, but at least it said something that Mr. Lowen was unwilling to say 2 years ago. He could not say that the airports, when jet commercial planes are being used, should be farther or maybe even could be closer together. They were making a study of the traffic holding and approach patterns that would be used by the jets.

Now apparently CAA has concluded that the use of the heavier and faster aircraft—and I suppose by that you are thinking of jets, commercial jets—would require the extension of the holding and approach patterns and would, therefore, make it desirable that airports located in the terminal complex be at a greater distance from each other than they are under present conditions.

Am I interpreting this sentence correctly?

Mr. PYLE. Mr. Meader, I think the answer to this question is certainly it is a valid interpretation in one respect; it certainly would be more desirable, it would be more desirable if we have only one airport in any terminal complex.

At this point it was concluded in our study you cannot come up with any criteria. It depends on the location of the airports themselves. It depends upon the navigation aids you use, the techniques you use bringing the aircraft into the airport, the existence of radars. There are so many variables that you cannot just come up with a rule of thumb that says they must be X-miles apart.

Mr. MEADER. Now, let me ask you whether the Civil Aeronautics Administration has made any study in any one case.

Mr. PYLE. We have made studies in a great many cases.

Mr. MEADER. Of a terminal complex and airport separation in that complex?

Mr. THOMAS. Yes.

Mr. MEADER. Have you made one of the Detroit complex?

Mr. THOMAS. Mr. Meader, I am sure we have. As a matter of fact, I think we did some 2 or 3 years ago.

The one I am more specifically familiar with, is in the Washington area here having to do with the location of the Burke and Chantilly.

Mr. MEADER. Let me ask you on that, was it as a result of that study that you abandoned your interest in the Burke site and moved to Chantilly?

Mr. THOMAS. No, sir; the study did show Chantilly from an air traffic control viewpoint, had some advantage over Burke. I think the advantage was about 5 percent. There were other factors relating to the two sites, such as convenience, land accessibility, and so forth. As you recall, the final selection was made by Mr. Quesada; it was not made by CAA. But as this statement would indicate and as you have indicated, it would show that Chantilly has an air traffic control advantage over Burke, although somewhat slight.

Now insofar as the faster aircraft needing more distance between them, this is true. The turning radius of aircraft is a function of its speed. For a 3° turn, that is 3° per second turn which is the conventional turn with piston driven aircraft, the diameter of the turning circle is equivalent to about 39 seconds of straight flight. So for 180 knots, which would be what we are normally accustomed to, we would have a diameter of about 2 miles.

Now, the jet aircraft at the higher altitudes turn at a degree and a half instead of 3°, so we use about 79 seconds of straight flight to determine turning diameter; and our speed is faster so therefore we get into tremendous areas for holding. But this is not done over the airport; it is done some distance out from the airport where the aircraft are held at high levels and then are brought into a secondary fix, and then radar vectored on in where they may or may not turn at 3°, which depends on the true airspeed.

Then we get into the problem of whether the two airports have parallel runways. If they have parallel runways, then we can feed them in from opposite sides of those parallel runways much closer together than if they are crossing or intersecting. These are the reasons why we need to take each pattern and study it.

In general, the wider, farther apart they are, the better, certainly.

Mr. MEADER. Well, now, frankly I find it difficult to say that some criteria cannot be eestablished for certain types of terminal complexes.

It would seem to me that there would be some general criteria that could be established even though you might have to make a specific study of each terminal in and of itself. But now I am particularly interested, as you know, in the airports in the Detroit area. As I understand it, the distance between the Detroit Metropolitan Wayne County Airport and the Willow Run Airport is somewhere in the neighborhood of 8 miles, which would be half the distance mentioned in the Curtis report.

Mr. THOMAS. Yes, sir.

Mr. MEADER. As I understand it also, the projected line of the instrument runway at the Wayne major airport, which was constructed after the Willow Run Airport was already in existence and in use—converges with the projection of the instrument runway at Willow Run about 18 miles out, something like that.

Mr. THOMAS. I believe that is correct, sir.

Mr. MEADER. Now as I understand it, you have conducted some kind of a study based upon the expectation of using jets commercially with respect to the Detroit terminal complex and these two airports; is that correct?

Mr. THOMAS. I am not sure, Mr. Meader. We run a rather large simulation program at Indianapolis. Whether or not we did this with respect to introduction of jets, I do not know.

Excuse me, sir, I believe we have some information on it.

Mr. MORRIS. It was started the 14th of July and will be finished August 8.

Mr. MEADER. July of 1958?

Mr. MORRIS. Yes, sir; it is going on now.

Mr. THOMAS. With specific reference to the Detroit area.

Mr. MEADER. That is one being conducted in your laboratory in Indianapolis?

Mr. PYLE. Indianapolis.

Mr. MEADER. Now, the reason I am a little bit disturbed is because so little seems to have been done since Mr. Lowen's testimony 2 years ago. You are presenting to Congress another extension of the airport program which I understand will have the same features as the one that is just about to be completed.

It seems to me before we pour a lot more money into airports some of these problems should have been settled, and that we do not find ourselves pouring money wastefully into airports, one of which is going to be abandoned because they necessarily conflict with each other.

Mr. PYLE. I would like to point out, Mr. Meader, that contrary perhaps to your belief, this has not been true. It has not been overlooked; we have looked over it carefully. We come to the conclusion we do not come up with any criteria.

We may be wrong, we may not be doing our business properly, but this is the fact. I do not see that we are wasting anybody's money in this area if in our good judgment this is the way to do it.

We feel that we have to provide safe separation. It happens that we have three airports in the New York area all within 8 miles of each other and we operate more traffic in and out of there than any other place in the world.

Mr. MEADER. You are not using the jets commercially there yet.

Mr. PYLE. They present no problem.

Mr. MEADER. Maybe I got more out of Mr. Lowen's testimony than I had a right to, but I understood that in about 6 months from that time, the CAA was going to know something definitely about desirable distances between major airports.

Mr. PYLE. We have studied it and in accordance with his testimony, and we find we cannot say anything more than a figure that is completely theoretical, not practical. We have to take each complex and study it and find cut exactly how to handle it.

South of here we have restricted areas. This affects the Burke problem.

Sure it would be desirable to have no restricted areas, but that is not the way it is built. We have to live with those restricted areas.

So these are the kinds of things that have to be cranked into this kind of problem in order to come up with the right answer. The right answer is you cannot lay down a rule.

Believe me, it would make our life a lot easier, we would not have to worry about this problem, just say, "Look, you don't do it except 16," or whatever number of miles it is. But in all practicality this is not the way you do it. You have to sit and work out by the hard way each individual situation.

Now we are going to have problems in areas. We would much rather not have 3 airports in New York, but the city cannot get along without 3 airports. We have got to live with it. Actually we have five airports in New York when you come right down to it, including Teterboro and Floyd Bennett.

Mr. MEADER. When your study in Indianapolis is completed the 8th of August, will there be some memo or report written on the findings of that study?

Mr. PYLE. Yes. It will not be available by the 8th of August.

Mr. MORRIS. That is when they will finish the report.

Mr. MEADER. Would it be in order for each member of this committee to have a copy of the report when it is made?

Mr. PYLE. Surely.

Mr. MEADER. I would like to have it.

Mr. PYLE. Anything is available that we do.

Mrs. GRIFFITHS. I would be pleased to have a copy.

If you have no further questions, would you care to continue?

Mr. PYLE. The national airport plan: In accordance with the provisions of the Federal Airport Act, the CAA develops and annually revises the national airport plan, which sets forth the airports which in our judgment are necessary to provide a system of public airports adequate to anticipate and meet the needs of civil aeronautics.

In formulating this plan, we take into account the needs of commercial aviation, private flying, the technical development of the aircraft, the airborne equipment, and the ground environment in which the aircraft operate. There is attached, as attachment 5, a copy of the current national airport plan, and I believe you have a copy—this yellow document [indicating].

As in the case of all national airport plans, this was developed by the CAA after consultation with all affected State and local agencies and reflects the needed airport development.

In this connection, the planning manuals on which the national plan is based are currently being reviewed and brought up to date. One of the most critical problems in the revision of this planning material is the advent of the civil jet transport aircraft. We have entered into a contract with the University of California for the conduct of studies of air commerce route patterns and passenger potential which will result from the introduction of jet airliners on the domestic and overseas air routes. The end product of this study is expected to provide, among other things, the maximum

length haul, nonstop, and passenger potential over a period of the next 15 years for the principal airport locations in the United States.

We have, in addition, undertaken independent studies of our own to identify the airports where civil jet aircraft will initially operate, so that overall planning and programing of Federal funds can be related to the needs of the civil airports which will receive jet transport aircraft. This possible service pattern is illustrated on some charts which we have brought with us for the information of the committee.

Mr. MEADER. Madam Chairman, when do you anticipate those studies will be completed?

Mr. PYLE. This is a contract which has just—I am sorry, what is the target date?

Mr. BORSARI. We want the preliminary report by the first of the year. We have asked for the preliminary report by the first of the year—January.

Mrs. GRIFFITHS. Is this preliminary report contracted out or are you doing it yourself?

Mr. BORSARI. Contracted out to the University of California.

Mr. MEADER. When will the final report be available?

Mr. BORSARI. The contract is for a year, sir.

Mr. MEADER. For a year?

Mr. BORSARI. Yes.

Mr. PLAPINGER. Is this in addition to the study that is being conducted by the University of California for the Airways Modernization Board?

Mr. BORSARI. This is in addition.

Mr. PLAPINGER. Runway design?

Mr. PYLE. Yes; this is in addition.

Mr. PLAPINGER. Who is doing this at the university, incidentally?

Mr. BORSARI. Ours? Horonjeff.

Mr. PYLE. It is an entirely different objective.

Mr. BORSARI. We think the Air Force is being used——

Mr. MEADER. Excuse me, does the reporter have your name?

Mr. BORSARI. Borsari, Director, Office of Airports, CAA.

The dots are the airports we think will be the initial jet airports and the striped dots are the alternates. This particular one [indicating chart] is Baltimore.

Now, the possible route patterns connecting those airports are like this [indicating chart].

Now, in 1960, the sold will be the additions and the striped dots will be the alternates.

Mr. MEADER. Before you go too far, Mr. Borsari, I see you have Detroit kind of off there all by itself.

Would you not expect any jet service between Detroit and New York?

Mr. BORSARI. We have that coming up.

The blue pattern is this [indicating].

Then in 1961——

Mr. MEADER. But you do not expect Minneapolis to have any jet service at all?

Mr. BORSARI. I was going to show it now. Let's not give up.

See, this is 1961 [indicating chart].

Then the new pattern.

That is because of the information we just could not get.

Mr. PYLE. I think it might be important, Mr. Meader, to point out these are in the nature of guesstimates, because actually the carriers are the ones that determine the pattern, the carriers and Civil Aeronautics working together. But this is our best evaluation of about how it is going to set up, based on equipment programs, individual airline equipment programs, and so forth.

I think it is reasonably authoritative, but I would not want the record to show this is the Government's idea. I think this is important; the carriers are the ones that determine how these aircraft will be flown.

Mr. Meader, if I could go off the record for a minute.

Mrs. GRIFFITHS. Off the record.

(Discussion off the record.)

Mrs. GRIFFITHS. Proceed.

Mr. PYLE. The status of Government activity with respect to the imminent introduction of nonmilitary jet aircraft——

Mr. PLAPINGER. May I ask a question?

When are we going to stop?

Mrs. GRIFFITHS. We are going to stop for today on "jet aircraft."

Mr. PYLE. Yes, page 19.

Mr. PLAPINGER. I was interested in your national airport plan.

Are you satisfied there is in existence now an adequate national network of airports?

Mr. PYLE. Yes, I think we have an adequate system.

Mr. PLAPINGER. And do you think that that is adequate, notwithstanding the introduction of commercial jets, taking into consideration the fact that the volume for airplane traffic will probably be doubled by 1965, is it? Or 1975, according to the Curtis report.

Mr. PYLE. Well, I think in all fairness, as the aircraft traffic increases, there will have to be provision made for more airports. But as they stand now, we have enough to meet this pattern that is set forth as our best evaluation of how these jets will be flown, and we will be in tune with the increase of that pattern, as we showed, in 2 years.

I think this is a fair statement, is it not?

Mr. BORSARI. Yes, sir.

Mr. PLAPINGER. I am reading from a statement of Under Secretary Rothschild before the Senate Interstate and Foreign Commerce Committee on April 14, on S. 3502. Mr. Rothschild said that "Airports have come a long way toward self-sufficiency."

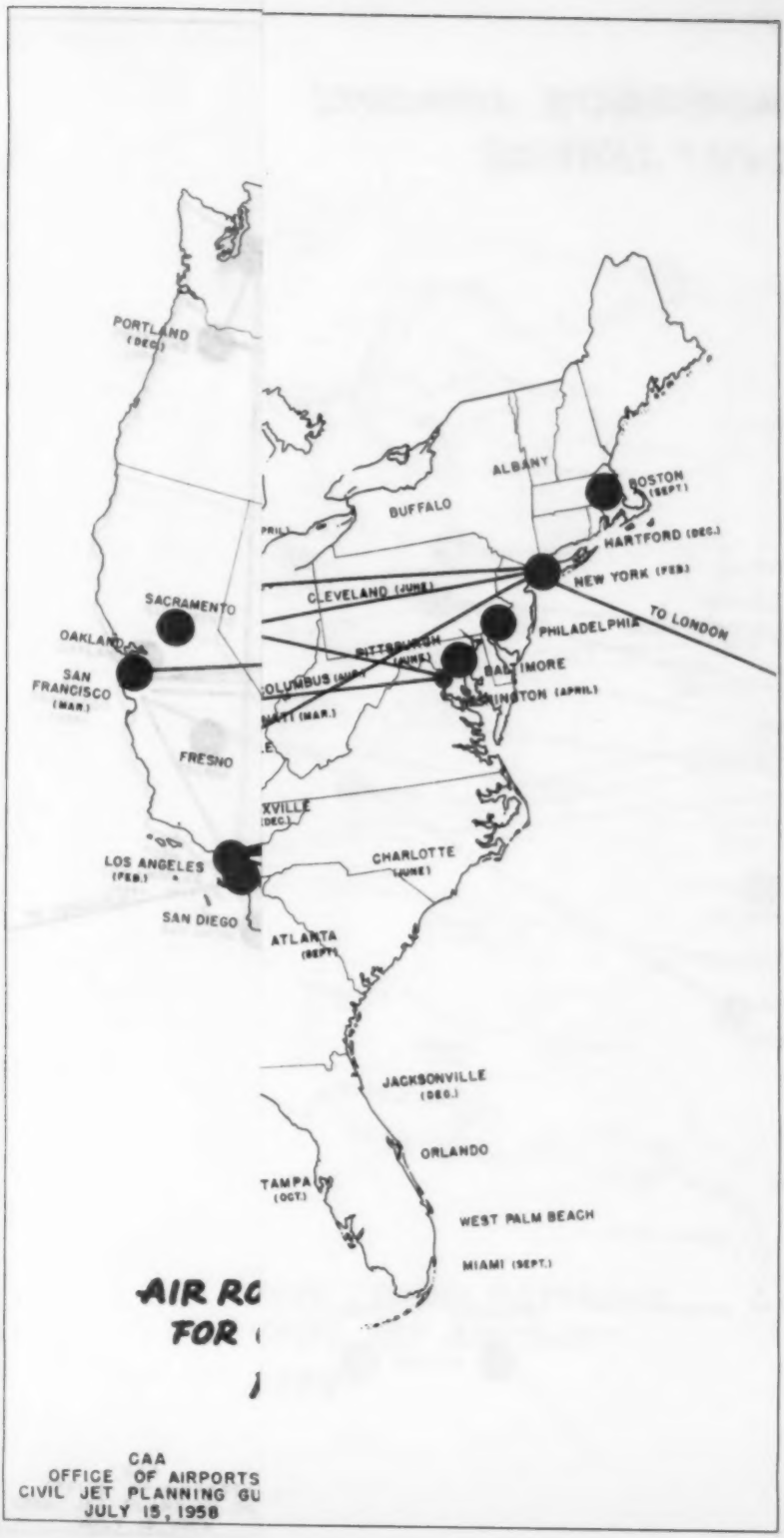
I was curious as to the basis for that statement.

Mr. PYLE. Well, I think it is based on evaluation of a great many of the airport operations which, by real hard work on the part of airport operators, have achieved a long way toward self-sufficiency.

Mr. PLAPINGER. Well, has the CAA made studies to determine what airports are self-sufficient?

Mr. BORSARI. No, we have not made studies of individual airports, but we get reports whereby it shows more and more airports are self-sufficient.

Mr. PLAPINGER. What form do those reports take, Mr. Borsari?



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CIVIL JET PLANNING GUIDE
JULY 15, 1958

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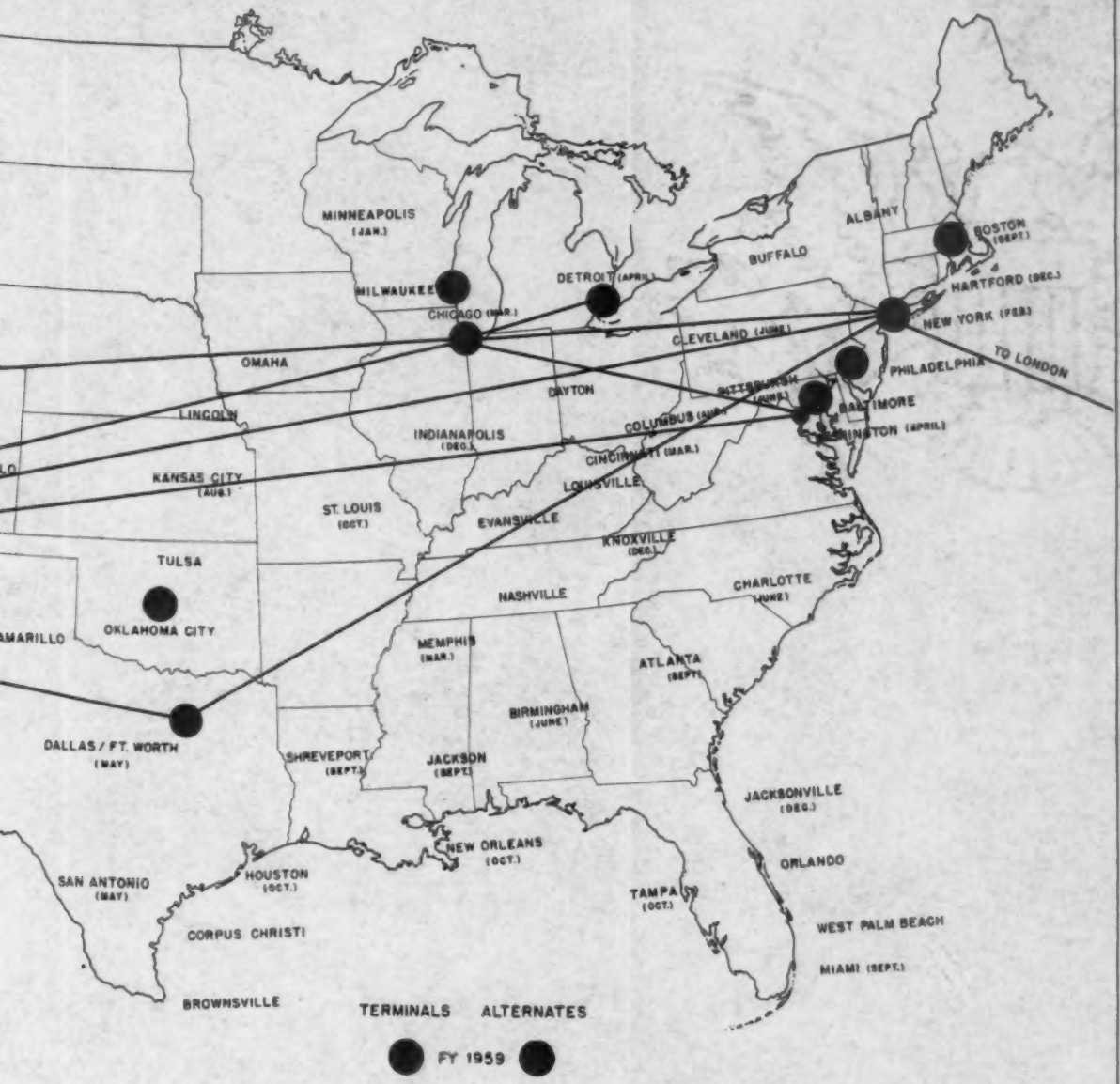

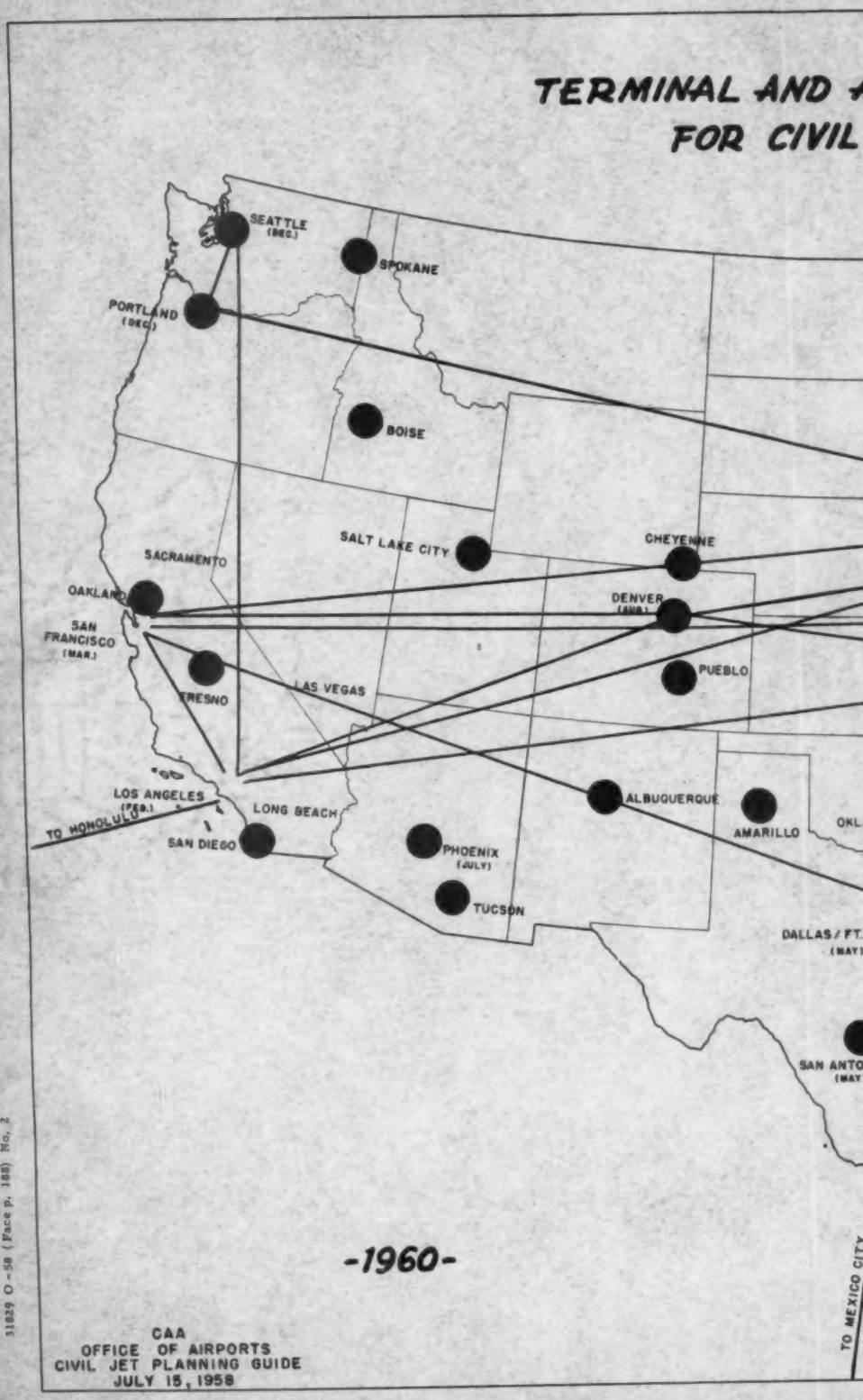

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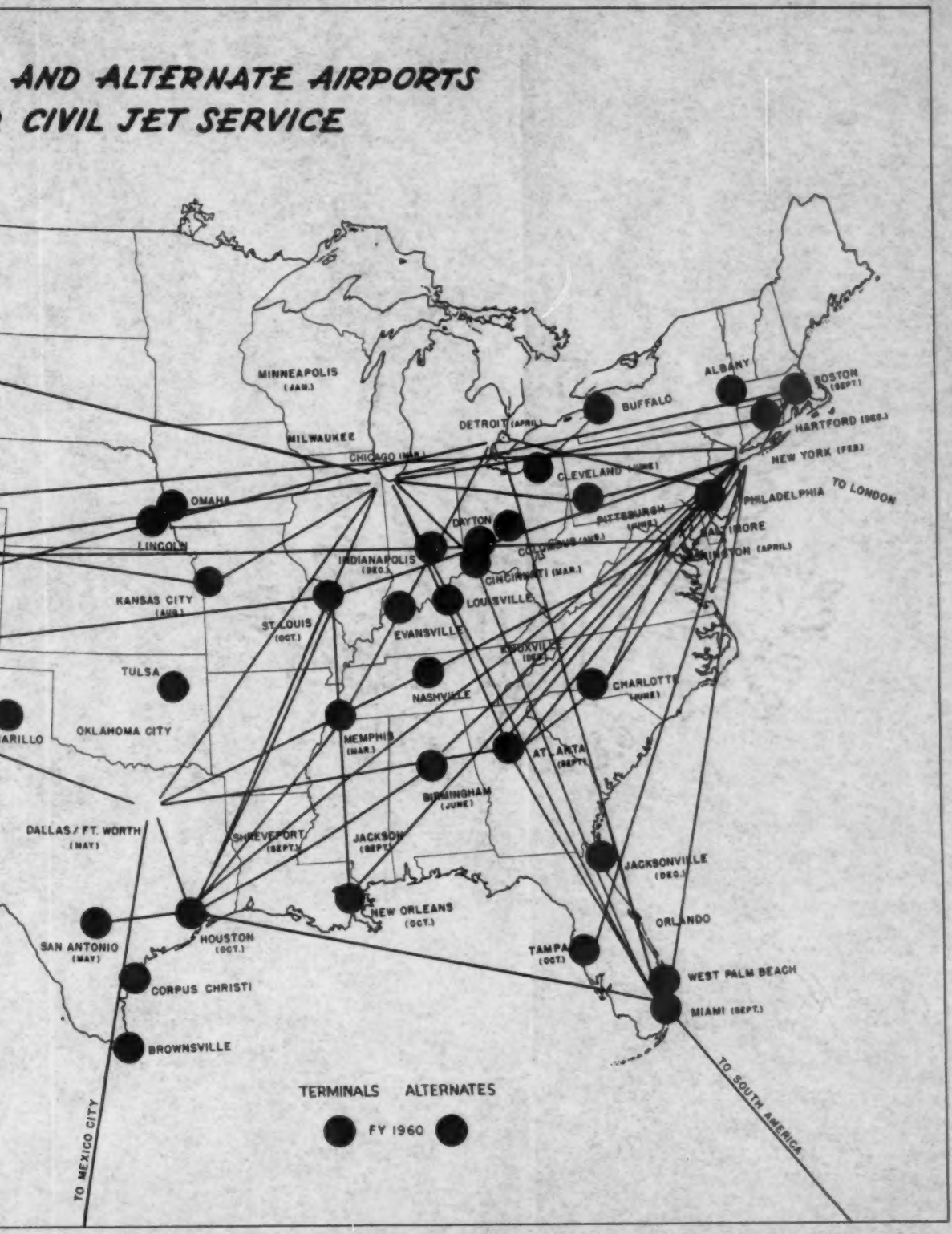
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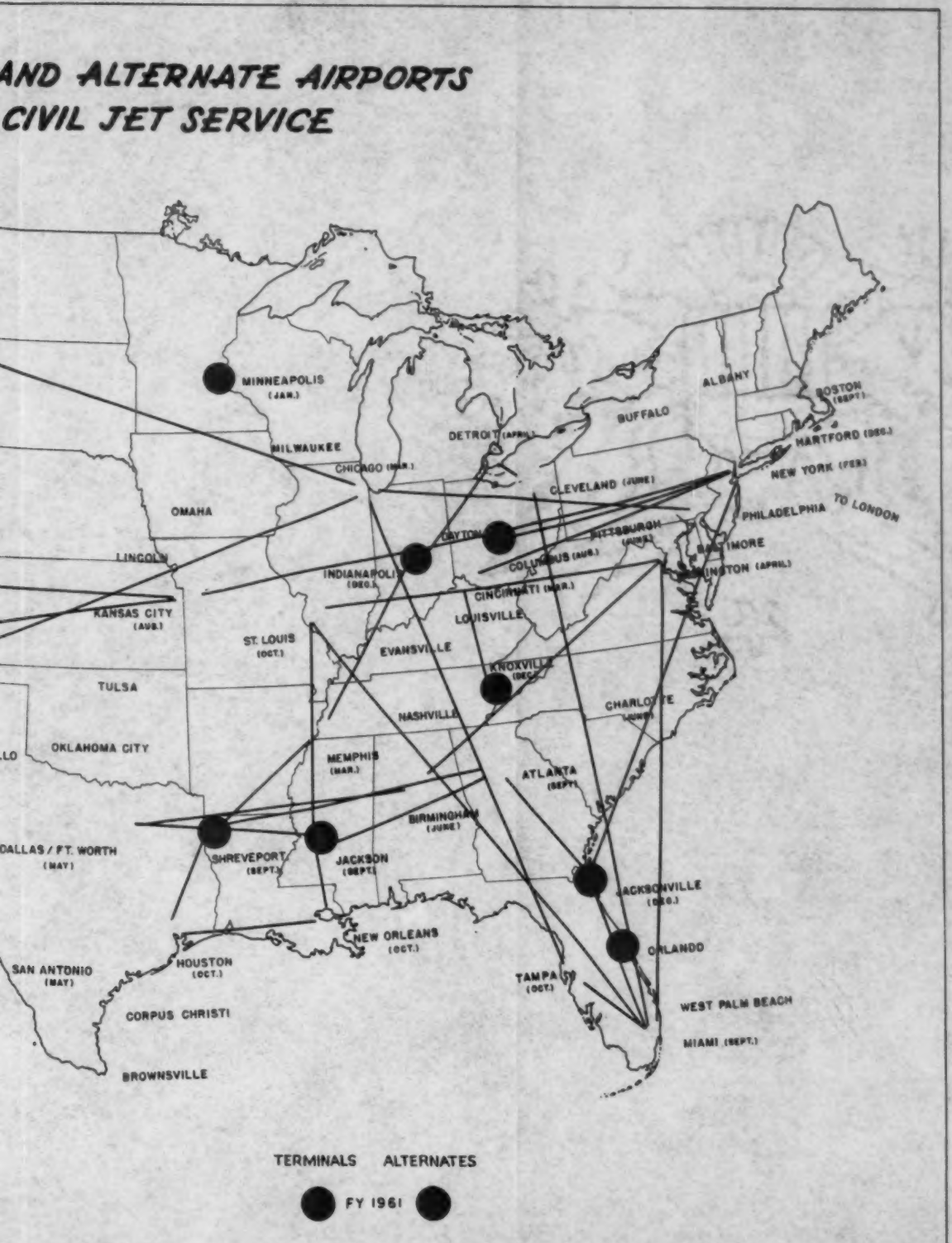
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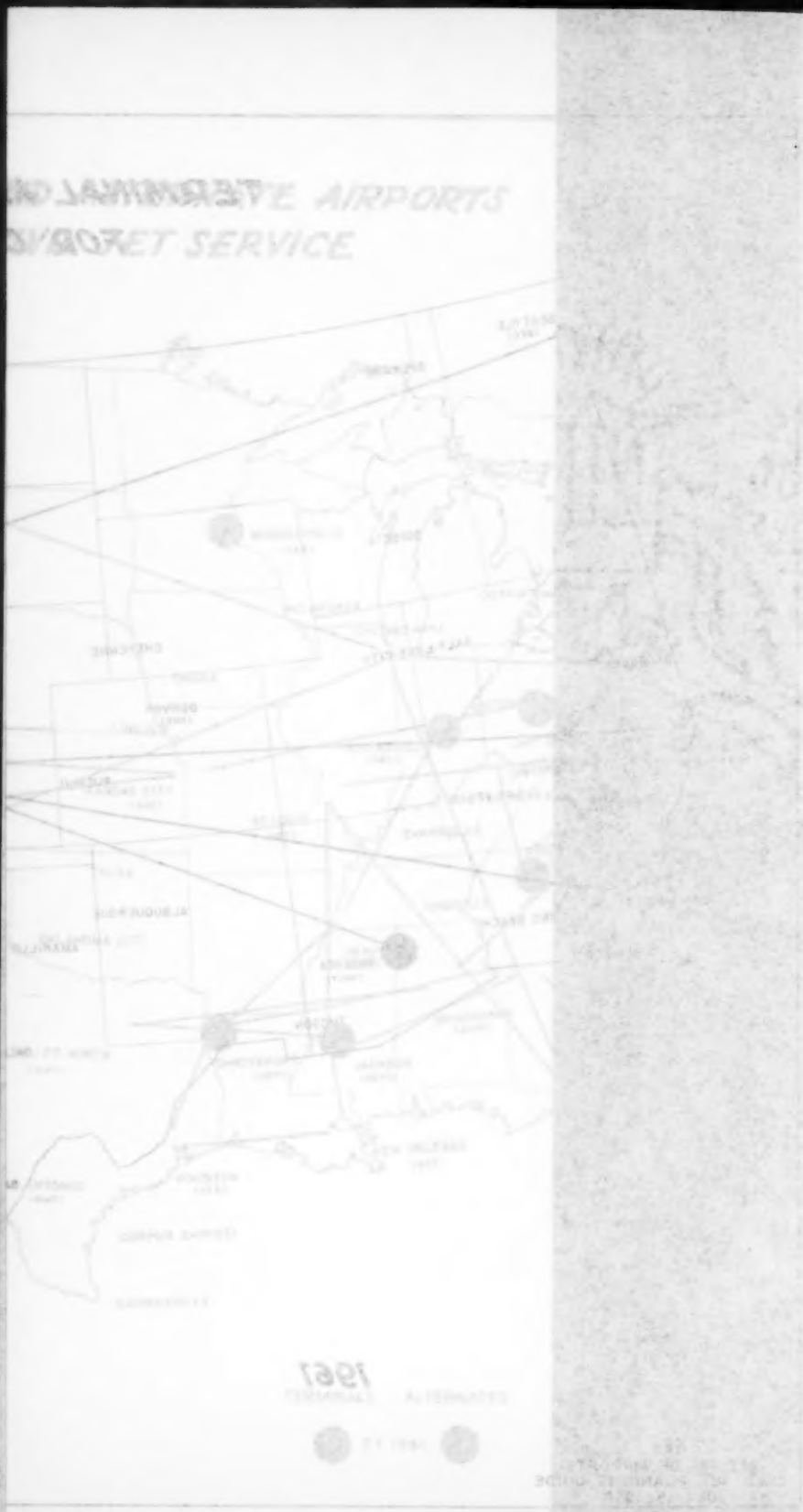

Mr. BORSARI. Yearly we get reports as they pertain to the surplus airports program. Those have financial statements attached to them in most instances. We can see from those the airports that are getting more to the self-sufficiency stage.

Mr. PLAPINGER. Can you cite the names of some cities that are approaching self-sufficiency?

Mr. BORSARI. I assume you are talking about income and operating expenses, not debt.

See, when you get into that field, you are in the field of bonded indebtedness, paying off debt and rebonding. You are in a——

Mr. PLAPINGER. You just cannot ignore these little items.

Mr. BORSARI. No, but I just want to make sure that the record understood or was clear on the statement that you are asking one of self-sufficiency——

Mr. PLAPINGER. Well, have you examined into the question of debt service in addition to operating——

Mr. BORSARI. No, we have not.

Mr. PLAPINGER. But you have received these reports that lead you to believe that the airports are becoming more self-sufficient?

Mr. BORSARI. Yes, sir.

Mr. PLAPINGER. Could you furnish for the record instances of airports that you deem are self-sufficient or approaching self-sufficiency?

(The information is as follows:)

There are transmitted, as attachment 4 (see appendix, exhibit 3, p. 466), financial statements of certain airports in the possession of this agency which, in general, indicate a trend toward profitable operations.

Mr. BORSARI. That is on the income and operating expenses?

Mr. PLAPINGER. Well, you say you have not made any analysis with respect to the debt service.

Mr. BORSARI. All right.

Mrs. GRIFFITHS. If there are no further questions, I believe we are going to let you go home for dinner.

You will be back tomorrow?

Mr. PLAPINGER. Yes.

Mr. PYLE. Shall we adjourn at this point, then?

Mr. PLAPINGER. Yes.

Mrs. GRIFFITHS. Yes, come back at 10 o'clock tomorrow.

(Whereupon, at 4:10 p. m., the subcommittee recessed, to reconvene at 10 a. m. Wednesday, July 23, 1958.)

FEDERAL ROLE IN AVIATION
(1958)

WEDNESDAY, JULY 23, 1958

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON LEGAL AND MONETARY AFFAIRS
OF THE COMMITTEE ON GOVERNMENT OPERATIONS,
Washington, D. C.

The subcommittee met, pursuant to recess, at 10:12 a. m., in room 1501, New House Office Building, Representative Martha W. Griffiths presiding.

Present: Representatives Martha W. Griffiths, George Meader, and William E. Minshall.

Also present: Jerome S. Plapinger, counsel, and Elizabeth D. Heater, clerk.

Mrs. GRIFFITHS. Let's proceed, gentlemen.

STATEMENT OF HON. JAMES T. PYLE, ADMINISTRATOR, CIVIL AERONAUTICS ADMINISTRATION, DEPARTMENT OF COMMERCE, ACCOMPANIED BY ROBERT P. BOYLE, GENERAL COUNSEL, CIVIL AERONAUTICS ADMINISTRATION; JOSEPH TIPPETS, DIRECTOR OF THE OFFICE OF AIR NAVIGATION FACILITIES, CIVIL AERONAUTICS ADMINISTRATION; DAVID THOMAS, DIRECTOR OF THE OFFICE OF AIR TRAFFIC CONTROL, CIVIL AERONAUTICS ADMINISTRATION; BURLEIGH PUTNAM, DEPUTY DIRECTOR, FLIGHT OPERATIONS AND AIRWORTHINESS, CIVIL AERONAUTICS ADMINISTRATION; BARTHOLOMEW SPANO, JET PLANNING OFFICER, CIVIL AERONAUTICS ADMINISTRATION; HERBERT E. DIXON, CHIEF, WAGE ADMINISTRATION DIVISION, PERSONNEL OFFICE, CIVIL AERONAUTICS ADMINISTRATION; PHILLIP A. HAHN, CHIEF, ENGINEERING DIVISION, OFFICE OF AIRPORTS; AND GEORGE BORSARI, DIRECTOR, OFFICE OF AIRPORTS, CIVIL AERONAUTICS ADMINISTRATION

Mr. PYLE. I believe, Madam Chairman, we were on page 19.

Mrs. GRIFFITHS. Page 19; right.

Mr. PYLE. In the middle of the page; VIII.

Mr. PLAPINGER. Madam Chairman.

Mrs. GRIFFITHS. Oh; wait just a minute. Mr. Plapinger would like to ask some questions.

Mr. PLAPINGER. Mr. Pyle, we were talking yesterday about the national airport plan in connection with the opposition of the Com-

merce Department to the proposed Federal Airport Aid Act extension in S. 3502. I was interested in that position as against the contents of the national airport plan, where you have an analysis of what facilities exist, and what is required. I assume what is required is not now in existence; is that correct?

Mr. PYLE. I think that is a fair statement.

Mr. BORSARI. Well, the national airport plan shows both; what is required and what is there.

Mr. PYLE. That is right.

Mr. BORSARI. And categories.

Mr. PLAPINGER. Right. And this goes to the question of what we were talking about yesterday concerning the adequacy of the present airport system. If you have all of these airports that are required, I do not understand quite how you can say that the present system is adequate.

Mr. BORSARI. Well, I think there is the clouding issue there that what is required could be existing. The word "required"; the national airport plan shows what the facilities are that are now there, as to categories, and some of the things that have to be done which are not in the plan to bring it up to that category which you are talking about.

Mr. PLAPINGER. What you are telling me now is, where you have a double heading "Existing" and "Required," the "Existing" and "Required" may coincide in that what is existing is required?

Mr. BORSARI. That is right.

Mr. PLAPINGER. But is the opposite true? In other words, that there is an airport in existence which is not sufficient?

Mr. BORSARI. That could be.

Mr. PYLE. I would like to elaborate on the first, Mr. Plapinger, because it is a good one. The Commerce position, I think, can best be summarized to this extent——

Mr. PLAPINGER. Excuse me. You say the Commerce position. As a matter of mechanics, is CAA itself asked to comment on the bill independently of the Department of Commerce?

Mr. PYLE. No; no.

Mr. PLAPINGER. Who sets the position? Is it the Department of Commerce?

Mr. PYLE. Department of Commerce.

Mr. PLAPINGER. Not the CAA?

Mr. PYLE. That is right. Now, the Department of Commerce prosition, I think, can best be summarized to this extent; there is no denying that the national airport system is always in need of improvement, just as the highway system. You always need more highways, improved highways. You need more airports and improved airports.

The point, however, is that there is a priority in requirement for Federal funds. The Department's position, in which we concur, is the requirement to build up the electronics, the Federal airways plan, and get this job done. This is the urgent requirement for both civil and military aviation. And, as an order of second priority, there is the airport requirement. Now——

Mr. PLAPINGER. I did not get that sense or sequence of priority from the Under Secretary's statement. I had the impression that airports have reached the point of self-sufficiency and, therefore, were to be cut off from further aid.

Mr. PYLE. Well, I think, in fairness, we should and will furnish you, and for the record, Madam Chairman, the statement that was made yesterday before Mr. Harris' committee, which sets this forth, I think, a little more clearly than was the case in the Senate testimony. Do you have a copy of that?

Mr. PLAPINGER. No.

Mr. PYLE. I will see that you do. We have a copy of that.

Mr. BORSARI. Yes; I have one here.

Mr. PYLE. Could I enter this for the record at this time?

Mrs. GRIFFITHS. Yes. Since there is no objection, we will put it in. (See appendix exhibits 4A and 4B, pp. 485, 488.)

Mr. PLAPINGER. I was interested in this problem because it seems to conflict with the Curtis report, which states, at page 35, that—

> Consistent with progress toward self-sufficiency, the Federal Government should reasonably look forward to the eventual curtailment of direct financial participation in airport construction.

This was only May of 1957, and "eventual" would seem to me to be at least 4 or 5 or more years following 1957.

In addition, there are other areas that I am interested in under the Federal Airport Aid Act.

At present, you are able to exercise some degree, or maybe even a considerable degree, of control over design?

Mr. PYLE. Yes.

Mr. PLAPINGER. Now, what is going to happen in the absence of Federal-aid-for-airport funds?

Mr. BORSARI. In addition to the work we do in the Federal airport program, we also have what we call an advisory service that keeps current and does the standards work and the requirement needed for engineering development. Those still continue.

Mr. PLAPINGER. Is your planning going to continue, also?

Mr. BORSARI. Planning will continue.

Mr. PYLE. Yes.

Mr. PLAPINGER. Of course, your advice is worth very much more, I would assume, where you have the hands on the purse strings.

Mr. PYLE. It can be more effective that way.

Mr. BORSARI. More effective. [Laughter.]

Mr. PYLE. But I think there was one point—so you get a complete picture, Mr. Plapinger—in regard to the priority that I mentioned, there is the fact, also that the airports are increasingly doing a better job. And it is at this point that the Commerce Department feels that, with the priority of necessity being on the Federal airways plan and concurrently the airport getting in a better position, they and the community, at least, can better take care of their requirements. It would be very nice if there was enough money in the Federal till to do everything, but there just is not.

Mr. PLAPINGER. Of course, you are preparing the airports to receive much more traffic than they do now, through your airways modernization plan.

Mr. PYLE. The number of traffic is not necessarily going to create too much of a problem with a well-planned airport. The length of runway may be a problem as jets increase, as an increasing number of communities get jet service.

Mr. PLAPINGER. Is much being done with respect to increased runways, incidentally? You and I talked, at least, in January about the then imminent change in the runway length standard.

Mr. PYLE. Yes. Mr. Borsari has the picture; he can give it more quickly and better than I can.

Mr. BORSARI. That was one of the subjects in the next section.

Mr. PLAPINGER. We will wait until you reach that.

Mr. PYLE. Yes.

Mrs. GRIFFITHS. Are you finished?

Mr. PLAPINGER. I am.

Mrs. GRIFFITHS. Will you continue, then, Mr. Pyle? Unless you have some questions you want to ask on airport construction, Mr. Meader.

Mr. MEADER. No.

Mrs. GRIFFITHS. Mr. Pyle, will you please continue?

Mr. PYLE. Starting in the middle of page 19, the Civil Aeronautics Administration has been gearing its activities to the needs of civil jet airline operations for several years. In January 1956, the CAA held the first major industry-Government jet planning conference and, in March 1956, established a special Jet Planning Group, composed of technical experts from the major CAA program offices and the United States Weather Bureau. This group has conducted an intensive series of investigative discussions with the major segments of the aviation industry and the military agencies on the operational requirements of civil jet transports. These investigations have been the basis for the development of guidance for CAA planning of facilities and procedures required for the operation of civil jet transports.

Periodic jet planning reports are issued by this group for the guidance of Government and industry in planning and preparing for civil jet operations.

To date, three reports have been issued, and are included as attachments 2, 3, and 4. (Not included in the record.)

Since the very long range and high speed of the civil jet transports make them a major vehicle for international travel, much CAA effort has been directed toward international planning for jet operations through United States participation in the International Civil Aviation Organization—ICAO—Jet Panel.

Mr. PLAPINGER. Mr. Pyle, does the ICAO require that United States furnish certain services with respect to weather?

Mr. PYLE. There are—I would ask Mr. Thomas, maybe, to speak to this point, but there are certain basic standards set forth for all members of the convention, and one of these is the weather. I think the specifics Mr. Thomas can give us.

Mr. PLAPINGER. I asked this question, Mr. Thomas, because someplace along the line we were told that the Weather Service will not be providing all-weather jet service for international jet operations this year, notwithstanding the provisions of the ICAO agreement. Is that correct? There was no item in the United States Weather Service budget this year for that service.

Mr. THOMAS. Mr. Plapinger, I am not familiar with the Weather Bureau budget, but, in general, ICAO convenes from time to time for regional meetings. At these regional meetings, which cover an

area of the world, such as the North Atlantic or the Mediterranean or South America, they develop regional plans.

These plans are the agreed upon required facilities for the operation of aircraft in the particular area. It is then incumbent upon each government represented to furnish the services that are listed in the plan, including weather, for the area.

However, ICAO has neither power nor method to see it is done. It is merely a meeting of the states to determine what is required, and then each state attempts to provide those services to the best of its ability.

There is always the provision "subject to availability of funds or national policy."

Mr. PLAPINGER. There has also been in the magazine issued by the National Business Aircraft Association, entitled "Skyways," in May of 1958, an article by Richard W. Groux, assistant to the executive director of NBAA, and entitled, "Weather Wonderland," saying:

> **The Weather Bureau offers less aviation service today than it did 10 years ago. During this period, there has been a loss of 85 weather stations and 279 weather service employees.**
>
> **During this same 10-year period, aircraft operations have more than doubled. CAA fix positions have quadrupled. Instrument approaches have increased sixfold.**
>
> **The total number of full-time Weather Bureau employees is 4,238. During 1957, the CAA increased their air traffic control staff alone by 2,400 employees.**

This would certainly lead one to conclude that there has been a diminution of weather service available to aviation.

Do you have any comment on that?

Mr. PYLE. Well, Mr. Plapinger, I really think in all fairness that really we should not comment on this. This is a separate bureau and they have their problems, I am sure. If it is proper, I would suggest that the questions be directed to them.

Mr. PLAPINGER. Well, have you found that the lack of weather information has hampered your own operations?

Mr. PYLE. No.

Mr. PLAPINGER. You have not?

Mr. PYLE. But this——

Mr. PLAPINGER. Have you ever heard anything comparable to what is contained in this article?

Mr. PYLE. I have read the article.

Mr. PLAPINGER. Do you agree with it?

Mr. PYLE. Well, they have problems. But my feeling is, in all fairness, I cannot speak for another bureau.

Mr. PLAPINGER. Well, I was interested really in the operations of the Weather Bureau as they affect the operations of the CAA and the users of the airway under your control.

Mr. PYLE. The users of the airway certainly would probably have some comment on this point.

The only comment we would have in this respect is as users of the Weather Bureau Service, and it has not hampered our particular operations.

Mr. PLAPINGER. I will ask this question of the users.

Mrs. GRIFFITHS. Do you have the possibility of your controller making suggestions to airports on number of telephones that are available in these little cow pasture airports?

I have had complaints from people that there is only one telephone at the airport, that the users of small planes stand around waiting for 30 or 40 minutes attempting to get weather information, and finally in desperation go on.

Now, of course it is terribly dangerous and some of them never reach their destination.

Just adequate telephone service in airports would help some, I think, for weather information.

Mr. PYLE. I think your point is extremely valid. However, this is not within our control except——

Mrs. GRIFFITHS. Would you make any suggestions or point this out or give it any publicity?

Mr. PYLE. We do work very closely with the Weather Bureau in trying to work out things. We have a committee set up between ourselves and the Weather Bureau to try to anticipate problems as they come up, such as the one you mentioned.

Mr. Thomas has a point, too, that perhaps he could speak to.

Mr. THOMAS. There is a great deal of this, Madam Chairman, over which we have no control.

Mrs. GRIFFITHS. Of course.

Mr. THOMAS. And there is some little portion on which we can help and are now in the process of helping.

In some locations where there is enough activity to justify it, we do extend what we call a fast line. It is really a full-time direct telephone service to our communications station that furnishes the weather information. A pilot at a busy airport can lift up a receiver much as you do to Western Union, and be connected directly to the communications station and thereby get the weather.

This is in preference to providing full-time employees at those airports to do this service. This has been very effective and we have expanded this quite a bit this year.

Mrs. GRIFFITHS. But it could be expanded further; could it not?

Mr. THOMAS. Yes, there is a balancing problem against the amount of usage and the cost.

Mrs. GRIFFITHS. Yes.

Mr. THOMAS. While not too expensive, it is some expense.

Mrs. GRIFFITHS. Thank you.

Mr. MINSHALL. Madam Chairman.

Mrs. GRIFFITHS. Yes.

Mr. MINSHALL. Mr. Pyle, have you not—or the Weather Bureau—in the past conducted some kind of voluntary opinion poll or questionnaire to the users of the airway regarding the adequacy of weather reports?

Mr. PYLE. This has not been a CAA activity to my knowledge, Mr. Minshall, but——

Mr. MINSHALL. Well, maybe it is the Airline Pilot Association or someone like that that has done it, or——

Mr. PYLE. I think it probably was—if anything it originated with the Weather Bureau.

Mr. MINSHALL. Are you familiar with any of the results of those questionnaires? They have been done, I know.

Mr. PYLE. Yes. You see, this again is Weather Bureau, a separate department. If there is any information to this extent, it would be in the Weather Bureau; not with us, CAA.

The only function, I think should be made clear, that we actually work with the Weather Bureau on is the distribution of the information over our teletype service. This we do handle. And as Mr. Thomas points out, it comes into our communication station and thereby is distributed over the radio, telephone, or whatever means; people come in and get briefed on the weather by our personnel. But this is strictly a dissemination and distribution function.

Mr. MINSHALL. I did not mean to say Airline Pilot Association, I meant to say AOPA, the private pilots association.

Mr. PYLE. AOPA.

Mrs. GRIFFITHS. Mr. Pyle, would you continue.

Mr. PYLE. The Technical Development Center has conducted several air traffic control studies on a specially developed, dynamic air traffic simulator to determine the requirements for safe and expeditious control of civil jet aircraft in dense traffic conditions. As a result of these studies, procedures for handling jet airliners have been developed.

A team, consisting of air traffic control personnel and representatives of the United States airlines, has visited each of the domestic CAA regions to explain these procedures and provide guidance in planning for the handling of civil jet aircraft in individual locations. Much of the basis for this work has come from over 12 years of experience in handling military jets which are generally more demanding of the air traffic control system than the civil jets are expected to be.

In the field of airport design, our criteria have been undergoing detailed review in light of the requirements of the jet-propelled civil airliners. Numerous studies related to all phases of airport design and construction are being actively pursued. We have been working closely with the Airways Modernization Board in many areas so that the greatest benefit will result from mutually coordinated effort. Specifically, these efforts have resulted in refinements of airport configurations and airport lighting which show great promise with regard to increased safety and efficiency of operations, particularly as related to clearing the runway of landing aircraft.

Mr. PLAPINGER. Mr. Pyle, what is your relationship to the Airways Modernization Board?

Do you tell them what you need or do they tell you what they are going to do? How does that work?

Mr. PYLE. Mr. Plapinger, I will be glad to go into that later when we deal with that specific topic.

Mr. PLAPINGER. All right.

Mr. PYLE. We have an exceedingly good relationship with them, however.

Mr. MEADER. Madam Chairman, I would like to ask a question, it might just as well be here.

Mrs. GRIFFITHS. Yes.

Mr. MEADER. You refer to this industry-Government jet planning conference.

Mr. PYLE. Jet planning group?

Mr. MEADER. Jet planning group.

Mr. PYLE. Yes, sir.

Mr. MEADER. You say they are studying all problems related to the civil jet airline operations.

Mr. PYLE. Yes.

Mr. MEADER. Would that include the question that I raised yesterday about the proximity of major airports in a terminal complex? Are they studying that problem?

Mr. PYLE. Well, this problem primarily has been worked out at the technical development center on the simulator.

Mr. MEADER. This industry advisory committee or jet planning group does not concern itself with that problem?

Mr. PYLE. Indirectly, they monitor what is going on and are fully aware of this particular work; but this is specifically a traffic control area that we are discussing here and this has been worked out—that second full paragraph on page 20, this is what is being done at Indianapolis.

Mr. MEADER. Does this jet planning group have some kind of an agenda?

Mr. PYLE. Yes, the attachments 2, 3, and 4 are reports of that jet planning group.

We also have Mr. Spano, who is the director of that group, head of that group, here this morning to answer any questions you may have on their activities.

Mr. MEADER. They do concern themselves with this question I raised yesterday, but only based upon the study being made at Indianapolis?

Mr. PYLE. Yes.

Mr. MEADER. Can you describe a little bit how that study is being done? I do not quite see how. And also I think our record should show why the study that Mr. Lowen suggested, with a couple of airplanes, was never carried out, too.

Mr. PYLE. On this last point, if I could speak to that first, I think I explained yesterday it was carried out and we came to the conclusion that there could be no criteria set up. I believe the record will show this very clearly.

Mr. MEADER. Well, what I referred to are these two planes he said he had just acquired.

On page 381 of our hearings, Mr. Lowen said:

> As I said yesterday, we start next month training our crews. We have a B–47 in operation. Within approximately 6 weeks after we receive it, which should be this month, then we have got to put in all of our radio gear and get it operational. As soon as we do that, have our problems worked out, we will bring in the B–47 type operation. I would assume that in 6 months, we will have many of the answers to the problems that are posed here today.

Now, I recall discussing this after the Brunswick crash when we had a couple of days of hearings on aviation. It seems to me as I recollect your statement at that time, Mr. Pyle, I got the impression that the study with the planes, the B–47—I think they also were going to have another jet plane, B–57—that you thought that was not a practical way to study the question of approach and holding patterns at airports.

Mr. PYLE. Specifically with respect to the B–47's, we concluded with the Air Force, and I was one of the principal ones that were involved, that the B–47 is a very critical airplane and that we just were not geared to handle it operationally; part of the problem, the expense of operating was so terrific we decided against taking one on the advice of the Air Force.

I did not want to expose our personnel to a dangerous operation for one thing; and secondly, the expense factor was phenomenal.

Now, we do have two B–57's, but they are primarily concerned with checking navigation facilities at 40,000 feet. This is their primary mission. And quite frankly, we have had a good deal of trouble in keeping them in the air due to problems similar to that encountered by the Air Force, engine problems. So that their full time is devoted to finding out what these navigation aids are doing at 40,000 feet as a more important mission. We feel that the point that you refer to is more adequately covered through the use of the simulator at Indianapolis.

Mr. MEADER. Now can you describe how that determines these problems or how you expect to determine them?

Mr. PYLE. Yes.

Mr. THOMAS. Mr. Meader and Madam Chairman, the simulator at Indianapolis is a very useful device. Essentially it is composed of a large movie screen on which we project spots of light. Each spot of light is controlled by a person acting as a pilot who controls its maneuvers through a specially devised projector that precisely simulates the flight path of an airplane on the ground.

These banks of projectors are operated by part-time employees by projecting light on the screen in accordance with the instructions issued by the controllers.

The screen is photographed by a television camera and then remoted into another room, so that it appears to the controller identical to a radarscope. Se he has a completely synthetic scope.

The projectors can make only the maneuvers that an airplane can make; that is, it cannot make a square turn, it turns at the proper radius for the given airspeed, and in all other respects.

The geography of the area being studied is drawn on a map and likewise projected, such as airport layouts, instrument landing systems, navigation aids. And the controllers then work with the different problems, feeding in more and more traffic of different types until they completely overload it.

It is an easy thing to study airport layouts, to try a runway in a north-south direction, and then actually measure how many airplanes that we can land, what the difficulties are, the time of communications, the ease of maneuvering insofar as the pilot is concerned. Then they can move it 15 degrees to the east, let's say, and they work on these various layout until they come out with the best arrangement for a new airport or the best traffic arrangement for existing airports.

Now, in connection with the study of jets, a very thorough study has been made on the best method of handling jets and there have been many thousands of simulated jet approaches made. They have been studied very carefully by our people and under contract with others, such as Franklin Institute in Philadelphia, in which we have arrived at what now appears to be the best possible method of handling the jets in the traffic-control system, both takeoff and departure. This takes into account the fuel consumption, aircraft performance, turning ability, separation between holding stacks and all other things of this kind. This report has been published. It has been published in several journals to my knowledge and has been presented at several technical conferences, in addition to the activities that are included in Mr. Pyle's statement.

Then we take a specific area, such as was mentioned yesterday, Detroit, which will be simulated. We apply all that we have learned to the Detroit area, to the Los Angeles area, to the Washington area as individual areas. We will have the experts determine which are the best patterns, the best arrangements in connection with the specific area, because usually the geography is fixed for us so we have to work within that area.

Mrs. GRIFFITHS. To what degree of perfection does the simulator really simulate conditions?

Mr. PYLE. Good.

Mr. THOMAS. Madam Chairman, it is as good, I believe, as any simulator. No simulator, I believe, is perfect.

Mrs. GRIFFITHS. None is perfect.

Mr. THOMAS. But this is certainly better than a paper study or better than intuition.

Mrs. GRIFFITHS. Yes.

Mr. THOMAS. We found that it applies in practice very, very accurately.

We measure the number of seconds that a given procedure requires of ground communications through simulation.

We have an advantage in the simulation in that we use humans and humans make mistakes in the simulators as they do in the airplane or in the control system. We also are able to pick up where the errors are likely to creep into the system; whereas, if we make a straight paper study, we forget that humans do make mistakes. So I think it is very good.

Mr. PYLE. I think there is one other point, Madam Chairman, that is important in using simulation, in this as well as in other areas.

If we, for instance, wanted to get 20 airplanes into a pattern to try to study an approach problem, the expense to the taxpayer would be inordinate, whether they were military or civil; whereas in the simulator we can do it for practically a negligible cost, using people on our payroll. We can just put them to work on this particular area. But a B–47 would probably cost us $1,500 an hour to operate; 2 of them, $3,000 an hour to operate. It would take hours of flying times 20 airplanes to get the job done.

So if you can do it in the simulator, which is to all intents and purposes the same—it accomplishes the same mission—we have saved a lot of money and done it more effectively and quicker.

Mrs. GRIFFITHS. Then when the simulator has told you that you can solve the problem by a certain method, do you try that with airplanes?

Mr. PYLE. Well, I think—go ahead, Mr. Thomas.

Mr. THOMAS. If it is a new procedure, yes. If it is a rearrangement of navigational aids—and this is more frequently what we come out with——

Mrs. GRIFFITHS. I see.

Mr. THOMAS. You really cannot do this except by simulating in an airplane.

Usually, then, the next step is the actual moving of the air navigation facilities to fit the pattern, because there is not an intermediate step of simulation that is practical.

Another advantage of simulation, and a very real one, is that we can be free from uninhibitions. For instance, on procedures, if we make a mistake and create a condition that causes collision—and we

well could with procedures; just two spots alike run together—we do not dare do this with live airplanes.

Mr. PYLE. Yes.

Mr. THOMAS. We really have to wring it out before we could ever go into a test program with live airplanes.

Mr. PYLE. I would like, Madam Chairman, to make this suggestion. Words are inadequate to describe this kind of procedure, it is complex, and at the committee's convenience, I would like to take a group out here and see this operation. It is really most interesting and it would give you a much better idea.

We could spend all morning describing it and still not get the environment, the flavors, of course, of what we are telling you.

Mr. MEADER. I might say I would like to take up Mr. Pyle's suggestion.

Mrs. GRIFFITHS. Well, we will remind the members of the committee; we will not take a vote on that right now.

Mr. PYLE. This is our obligation, to show you how this works and what we are doing.

Mrs. GRIFFITHS. Mr. Meader, since you raised this interesting question would you like to ask other questions?

Mr. MEADER. I would like to ask, Mr. Thomas, precisely what you expected to find out about the study of the Detroit situation?

What is the task given to the group at Indianapolis?

Mr. THOMAS. In broad terms, to find the best arrangements of procedures and patterns, arrangements of navigation facilities, which would produce the maximum number of aircraft operations in the Detroit area with safety. And this is extremely complex. As a matter of fact, it is difficult to study Detroit without taking into account Cleveland, Canada, Chicago, and everything else, because there is the airway structure coming in and out of Detroit that has an effect on airway structure coming in and out of Cleveland and Chicago, for example. So there will be many trials. We will have many people from Detroit there, controllers actually working with it. This is also an essential part; we cannot simulate with general knowledge of a specific community—we have to bring controllers in from that community to be a part of the team.

First they will guess it best to hold jets at a given part of Detroit over a given navigational facility. They will try this. Maybe it will work and maybe it will not. Based on what is learned, they will reexamine the problem and restudy it and put up other arrangements.

We can do that as easily as putting lines on a piece of paper and projecting it on a screen.

So fundamentally what we hope to arrive at is the very best arrangement of facilities in the Detroit area to serve that area.

Mr. MEADER. And that would be essentially to establish holding and approach patterns for jets?

Mr. THOMAS. And departure procedures.

Mr. MEADER. At existing airports?

Mr. THOMAS. As well as piston-driven aircraft—a mixture of the two.

Mrs. GRIFFITHS. Mr. Pyle, will you proceed.

Mr. PYLE. A review of the runway length requirements of turbine jet airliners has resulted in a proposed change in our standard order covering this critical phase of airport design. This revised

technical standard order is currently being coordinated with the affected segments of the aviation industry—carriers, airport operators, municipal authorities, pilot organizations, and so forth.

And, Madam Chairman, I think this is a point Mr. Plapinger wanted to discuss. Perhaps it would be appropriate to pause.

Mr. PLAPINGER. I was particularly interested in runway lengths.

Does the new order contain any recommendation with respect to runway lengths?

Mr. BORSARI. We have a proposed technical standard order being circulated now which does increase the runway lengths at all airports.

Mr. PLAPINGER. Well, the 8,400-foot restriction or limitation—is that——

Mr. BORSARI. We proposed 10,500.

Mr. PLAPINGER. 9,500?

Mr. BORSARI. 10,500.

Mr. PYLE. 10,500.

Mr. MINSHALL. Madam Chairman, we had some testimony, I believe, before this committee in 1956 as to runway lengths for jet aircraft.

You say a review of the runway lengths; that review has not changed those figures from 2 years ago, has it?

Mr. BORSARI. I do not know.

Mr. PYLE. Well, I think your point, Mr. Minshall, is that we have taken a critical look at the requirements in each airport category and that provides our technical standard order. This is a proposed revision which is then circulated, in accordance with proper Government procedure, for comment, to industry, to the airport operators, to the air carriers, and so forth.

As you can appreciate, if we extend the runway lengths and make this actually—actually what we are doing is stating that if you want in a certain category of airport a runway of a certain length, then these are eligible for Federal funds up to a total distance of 10,500 as against 8,400. We have extended it 2,100 feet.

Now, this has a terrific impact on the airport, on the community, on the air carriers, in terms of landing fees, and so forth. So we feel that all concerned should have their day in court to give us their reaction, what do they feel about this. This is the process we are going through right now.

Mr. MINSHALL. Are the runway lengths that you estimate that are going to be needed today basically the same as what you, Boeing, Lockheed, and the others gave before this committee 2 years ago?

Mr. PYLE. Well, I think that the proper way we could answer that question is to give you a copy of our technical standard order, bearing in mind, however, that this is only a proposal on our part. It is not firmed up yet. We have to sift all the comment that comes in and then come up to a decision which is equitable from the standpoint of the users, the operational requirements, and so forth.

Mr. MINSHALL. Are you familiar with the testimony that we had before this committee 2 years ago?

Mr. PYLE. I am afraid I will have to answer in the negative on that, Mr. Minshall. I do not know specifically what you are referring to as to the length.

Mr. MINSHALL. We had minimum lengths for various types of proposed jet aircraft for international operations, domestic operations, of course depending on the length of the flight, what would be the minimum length required for certain airports. I just wondered if the minimum length had been increased substantially or whether they remained about the same.

Mr. PYLE. I think we could give right from our information we have today the old technical standard order N–6–A, which had the runway lengths I think to which you refer. We can give you also our proposed new criteria. Now, we can do that right here, can we not, George?

Mr. BORSARI. Do you want me to recite them now?

Mr. PYLE. Yes, I believe this is responsive to your question.

Mr. BORSARI. Trunk category, from 4,200 to 5,000; the express category, from 5,000 to 6,000.

Mr. MINSHALL. What do you mean "trunk category"?

Mr. BORSARI. Classification of an airport.

Mr. MINSHALL. What is the "trunk category"?

Mr. BORSARI. "Trunk category" is the category we define by lengths of runways, the trunk being the smaller type category we have under the study of the TSO–N–6–B.

Mr. PLAPINGER. What kind of operation would be involved in a trunk category?

Mr. BORSARI. DC–3, light twins——

Mrs. GRIFFITHS. Not land a jet?

Mr. BORSARI. Well, no.

Mr. PYLE. Is there somewhere a definition that we could furnish the committee?

Mr. BORSARI. Yes, the definition is in the TSO–N–6–B order you were going to furnish them.

Mr. MINSHALL. Maybe we can simplify by asking this question. What are the minimum runway lengths required for a 707 to land for, first, an international operation and, second, a domestic operation?

Mr. BORSARI. Well——

Mr. MINSHALL. Can you answer that question that way?

Mr. PYLE. This becomes very difficult, Mr. Minshall, for this reason—and it is not trying to evade the question—how long is the international operation going to be? What is the altitude of the airport? What is the average temperature in which the fellow has to take off? There are so many variables that get connected with the problem.

Now, when we specify, for instance, the 10,500-foot-runway length, this is the runway length at sea level at 59°.

Now, the moment your average temperature goes up to 80°, 2,000 feet, you further lengthen the runway.

Now, the moment your average temperature goes up to 80° 2,000 feet, you further lengthen the runway.

Mr. MINSHALL. Considering year-round operation, what would be the minimum runway length you would need, say at sea level?

Mr. PYLE. It is our opinion 10,500 meets that requirement. That is the reason we came up with this figure. However, we also want the

advice of industry, the air carriers, the airline pilots, the manufacturers of the aircraft, all cranked in to be sure we have the right answer.

We have a big responsibility.

Mr. MINSHALL. In other words, for Cleveland, Ohio, to handle a jet operation, they are going to need runway lengths of 10,500 feet plus the increase of altitude that would be required?

Mr. PYLE. That is correct. If it is intercontinental express.

Mr. MINSHALL. For each 1,000 feet of altitude, how much more runway do you need?

Mr. BORSARI. Seven percent for each thousand feet; 7 percent.

Mr. MINSHALL. For jet operation?

Mr. BORSARI. Well, for increase in runway length.

Mr. PLAPINGER. This runway length extension is somewhat higher than you have in your Jet Age Planning No. 3, which was 7 to 10 percent. I think the Appropriations Committee was told 10 to 12 percent.

For instance, in the international continental express, you are going from 8,400 to 10,500, which is about 25 percent. Is that pretty much the standard increase, 25 percent?

Mr. BORSARI. I was going to give the figures, I mean I was going up the line from the small to the ——

Mr. MINSHALL. Let's let him put the figures in the record.

Mrs. GRIFFITHS. Please, do.

Mr. BORSARI. I think I got to "express," from 5,000 to 6,000; continental airport goes from 5,900 to 7,000.

In "continential" from 7,000 to 8,700; "intercontinental express" from 8,400 to 10,500.

Now, at the point we got on this other matter, what was a "trunk service carrier," we call it an airport to serve an airline trunk route. The "express" we call an airport at large cities or important junction points on trunk routes.

The "continental," we use that as definition of an airport serving long, nonstop continental flights. The "intercontinental" we use as airports serving long intercontinental or transoceanic flights; and the "intercontinental express" airports serve transoceanic flights of large types of aircraft.

Mr. PLAPINGER. You are going to furnish a copy of that proposed order?

Mr. PYLE. Yes. (See appendix, exhibit 5, p. 490.)

Mr. BORSARI. Mr. Pyle, Cleveland is at the present time a continental airport, and we propose to have it an intercontinental. Intercontinental as we have it would be 8,700 feet.

Mr. MINSHALL. In other words, from Cleveland, you plan to change that——

Mr. BORSARI. Make it intercontinental. Under the proposed TSO–N–6–B, it would be 8,700 feet.

Mr. MINSHALL. What does Cleveland have now?

Mr. BORSARI. That is the maximum.

I do not know what Cleveland has now.

Mr. PLAPINGER. Incidentally, my recollection is when we heard these engineers from Boeing and various aircraft companies, they were insistent there would be no runway length extensions required.

I may be wrong in that, but I would suggest possibly it may be of interest to you to compare their comments now with the comments we were given 2 years ago.

We would be glad to make any number of copies available of those hearings.

Mr. MINSHALL. If my memory serves me correctly, such as you say, Mr. Plapinger, these runway lengths are much longer than they were stated 2 years ago.

Mr. PLAPINGER. Well, my recollection is they said there would be no runway length extension required. At that time the TSO–N–6–A——

Mr. PYLE. TSO–N–6–A.

Mr. PLAPINGER. Was in effect, which is the first figure Mr. Borsari mentioned. He goes from 4,200, that was the TSO–N–6–A requirement at that time.

Mr. PYLE. Mr. Plapinger, I have no quarrel at all with what you say because I am sure that the manufacturers did state just that.

Mr. PLAPINGER. I am not sure myself, but that is my recollection.

Mr. PYLE. I am pretty sure they did. However, we do have to bear in mind this, in 2 years they have increased the weight of these airplanes, they have increased the range, the airplane customers have demanded this, and this is increasing the length of the runways. So as you increase the weight, the size of the airplane——

Mr. PLAPINGER. I am not suggesting an argument against it, but I just say this may be of interest, this testimony that was given 2 years ago, in view of their current comments.

Mr. SPANO. Mr. Pyle, perhaps we should point out some of the main bases for the runway increases are based on manufacturers' information.

Mrs. GRIFFITHS. Will you identify yourself for the record.

Mr. SPANO. Bartholomew Spano, jet planning officer.

Mrs. GRIFFITHS. Thank you.

Are there other questions?

If not, you may proceed.

Mr. PYLE. With respect to the airport planning activities, those airports where the jet aircraft will initially operate have been identified, as we saw yesterday in the charts, so that overall planning and programing of Federal funds can be related to the needs of the jet airports. In the planning field, also, the national airport plan is under revision to reflect the immediate airport requirements for these aircraft and their effect on the Nation's airport system.

In this field of airport visual aids, considerable work has been accomplished in lighting improvement and the future seems much "brighter" for pilots who must operate these large high performance aircraft under conditions of restricted visibility.

Centerline runway lighting systems, employing new flush-type fixtures, are receiving detailed study. A new touchdown floodlighting system is now being evaluated under actual operating conditions, and results so far are very encouraging. Pavement marking is also undergoing investigation.

Mr. PLAPINGER. Are you standardizing pavement markings?

Mr. PYLE. Yes, and also the type of paint that we use. Some have much better wearing qualities than do others.

I would like to point out in this connection, a lot of work has been done on this lighting problem. Airways Modernization Board is also very much interested in it.

To me, it is one of the keys to the ability to fly in all weather conditions, and I personally, and a lot of our people—we set up a problem at Andrews Field about a year ago and flew under the worst weather conditions we could find to try this system out. We now have some floodlights installed in Washington. And if any of you would like to go down and fly some night, we will show you what we think is an effective way of doing it at less cost than tearing up the runway and installing flush lights.

I think it is one of the keys to all-weather flying which, in my opinion, is just over the horizon. There are still problems which are unresolved, though, and much work that must be done by both Government and industry. However, every effort is being directed to planning and preparing for safe and efficient civil jet operation, and we feel that the necessary answers will be forthcoming in the very near future.

Because of the importance of this vital work and the intensified preparation and planning underway, an Assistant to the Administrator for Jet Age Planning was appointed on June 15, 1958.

Mr. PLAPINGER. Did you have an Assistant Administrator for Planning prior to this time?

Mr. PYLE. Yes; we did.

Mr. PLAPINGER. Do you have two Assistant Administrators for Planning?

Mr. PYLE. This is with specific responsibility in the jet area. This is to give increased support to Mr. Spano and work of his group to be sure it is correlated at the highest level with the program directors.

Mr. PLAPINGER. Do you have two Assistant Administrators for Planning?

Mr. PYLE. No; this is Assistant Administrator reporting directly to me in the jet area.

Mr. PLAPINGER. Do you have another Assistant Administrator for Planning?

Mr. PYLE. We have planning; yes.

Mr. PLAPINGER. To whom does he report?

Mr. PYLE. He reports to me, too, but we have a lot of planning to do in a great many areas; and in this particular area, we felt it was necessary to bring someone down here and pull all this together.

We are only 3 months away from jet operations.

Mrs. GRIFFITHS. Personally I think it is a good idea.

Mr. PYLE. This will help in the transition from planning based on estimates to the more detailed planning based on accumulating experience in actual civil jet operations.

To help the committee get a quick look at what the CAA Jet Planning Group has done from January 1956 to date, we have prepared a list of the important activities of the group during such period, and this is set forth in attachment No. 6, Madam Chairman.

(The information is as follows:)

ATTACHMENT 6[1]

CAA JET PLANNING GROUP HIGHLIGHT ACTIVITIES

January 1956: CAA called the first major industry-Government jet planning conference.

February 1956: CAA developed the 100 Problems of the Jet Age to stimulate specific industry-Government action.

March 1956: CAA established the Jet Planning Group, composed of representatives from the major technical offices, who, on a team basis, are responsible for investigating the operational requirements of civil jet transports and guiding the planning of facilities and procedures for civil jets.

June 1956: CAA initiated continuing study of jet noise technical and sociological problems.

July 1956: Jet Planning Group issued its first progress report on jet planning, giving the current status on the 100 problems of the jet age.

August 1956: CAA Jet Planning Group arranged the first major jet planning conference with aircraft industry in a meeting with Boeing at Seattle.

September 1956: CAA flew the Boeing 707 prototype in a series of special flight demonstrations.

October 1956: CAA met with USAF on military jet operational experience.

October 1956: CAA appointed United States panel member to International Civil Aviation Organization Jet Operations Panel. CAA also appointed Chairman of first meeting of this international activity, responsible to develop planning guidance for international operation of civil jet transports.

January 1957: CAA issued its second progress report on jet planning, setting forth technical guidance on airport requirements, air traffic control, and communication and navigation aids for civil operations. The report also considered the problem of civil jet transport noise.

March 1957: CAA attended special ground handling demonstrations of Boeing 707 to evaluate jet terminal operating problems.

April 1957: CAA Jet Planning Group held major jet planning conferences with Douglas, Lockheed, and Convair Aircraft Co.

May 1957: CAA accelerated its collaboration with the United States Weather Bureau on its meteorological requirements for civil jet operations.

June 1957. CAA chaired third meeting of International Jet Panel and a 200-page report on guidance for making preparations for civil jet operations was issued for worldwide use.

November 1957. CAA increased its membership on NACA Aircraft Noise Subcommittee and pressed for increased NACA research program on jet noise suppression.

December 1957. CAA Jet Planning Group held its first conference with major airline jet planning teams to ascertain specific airline requirements.

January 1958. CAA issued its third progress report on jet planning. This report covered the impact of new CAB airworthiness regulations for jets on runway-length requirements, technical airport requirements for jet operations, and the impact of jet aircraft noise on the future growth of the United States airways system. The report also covered the CAA interim high-altitude air-traffic-control plan and the CAA RB 57 jet aircraft program to measure the characteristics of air navigation aids at civil jet flight altitudes.

February–May 1958. CAA held three further meetings with major airline jet planning teams, continuing its investigation of specific airline operational requirements for civil jet operations.

May 1958. CAA proposed increased runway lengths for jet operations in its technical standard order, TSO–N6b.

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[1] Statement of James T. Pyle, Administrator of Civil Aeronautics, before the Legal and Monetary Affairs Subcommittee, House Committee on Government Operations, at hearings on Government's role in aviation.

May 1958. CAA held major jet planning conference on corporate jet aircraft requirements by meeting with Lockheed on its utility jet transport, Jetstar.

June 1958. CAA met with SAC to study USAF operational experience with the KC–135, the military jet transport version of the Boeing 707 jet airliner. The Jet Planning Group also participated in a special KC–135 transcontinental flight to monitor firsthand a typical transcontinental jet operation.

July 1958. A special planning study, showing the impact of noise on the United States air transportation system, was developed and presented to the management of Douglas, Lockheed, Convair, Rohr, and General Electric.

July 1958. A special presentation on the results of CAA's investigation of jet noise is being developed for government, industry, and public groups. This presentation will cover the characteristics of jet noise, suppression methods, low-noise takeoff paths, community noise levels, recommended measures for introducing jet operations to a community, and current research trends on jet noise reduction.

Mrs. GRIFFITHS. Yes.

Does anyone have any questions he would like to ask on this? You may continue, Mr. Pyle.

Mr. PYLE. With respect to jet noise, the Civil Aeronautics Administration is conducting special studies on jet noise characteristics and its impact on communities in the vicinity of airports. It has investigated various measures that can be taken by the manufacturer, airport and airline operators, and other interested groups, but has found no easy solution to the problem of reducing the noise without seriously affecting the power of the jet engine.

The ideal solution would be the reduction of the noise at its source, but efforts in this direction so far have not produced significant results without an exceptional reduction in power output. In spite of these difficulties, however, the National Advisory Committee on Aeronautics, which has been hard at work on the fundamental technical aspects of this problem, is being urged to substantially increase its efforts in this direction.

I would like to point out, Madam Chairman, I am also a member of the National Advisory Committee on Aeronautics, and I am, thus, in a very fortunate position of being sure they do put increased emphasis on this important area, and have done so in my capacity on one of their committees.

Mr. PLAPINGER. Mr. Pyle, in a magazine that we received a short time ago, entitled "Boeing Magazine," July 1958 issue, it is stated at the conclusion of an article on sound suppression, entitled "Docile Decibels," that—

> Sound levels of the suppressor-equipped 707 airliner recorded in the Boeing tests were lower than sound levels of long-range piston-engine transports at the same points along the takeoff and climb path.

And it goes on to say that that information has been made available to the Government. Are you familiar with these tests?

Mr. PYLE. Yes; we are very familiar. Mr. Spano actually may become almost the world's leading authority on this noise problem. I would like to caution the committee, however, that I am afraid that is an optimistic statement, quite frankly. It is not proving quite as successful as that. I do, by the same token, want to give all due credit to Boeing for an awful lot of work in that area, and we have actually flown in that noise-suppressed plane.

Mr. PLAPINGER. They mention $10,000,000. I take it that is the company you refer to in your statement.

Mr. PYLE. Would you like to have Mr. Spano expand a little bit on this noise problem? He has done an awful lot of work in this area.

Mrs. GRIFFITHS. Mr. Meader?

Mr. Minshall?

Would you like to have an explanation by an expert on noise?

Mr. PYLE. I am just thinking of the time; that is all.

Mrs. GRIFFITHS. Well, would you continue, then?

Mr. PLAPINGER. Mr. Spano, please submit a statement for the record giving us some idea what is being done by the Government and industry on jet noise.

Mrs. GRIFFITHS. That would be fine. We would appreciate it very much.

Mr. PYLE. We would be glad to.

Substantial sums have been spent on suppressor development by industry—and this refers specifically to Boeing's effort and Douglas' effort, too, in this area; 1 engine manufacturer citing over $3 million and 1 airframe manufacturer over $10 million spent in this development. One suppressor type is presently undergoing CAA flight tests as part of the test program on a new transport, and this is the Boeing suppressor—right, Bart?

Mr. SPANO. Yes, sir.

(The following information was furnished:)

Though considerable test and development work has been done on jet-noise suppression, actual experience with the noise of large civil jet transports is only now becoming available with the first operations of the Pan American-Boeing jet airliners. This operational experience will be the first true indication of the loudness of the civil jet transports, and CAA is actively participating with airport and airline groups in actual Boeing 707 airport noise measurements and in studying airport noise alleviation techniques.

It must be noted that noise tolerance can vary greatly from one airport community to another and what might be of deep concern to one airport may not really affect others. The many factors involved in the different reactions of airport communities to noise are being intensively studied by CAA. Some of these factors are the distance of the community from the start of takeoff roll, frequency of operations—day and night, general climatological conditions, the history of the airport with the community, the character of the community population, and ambient noise.

Mr. PYLE. In addition to reducing the noise at the source the CAA has been working on a number of other aspects. One is the use of preferential runways wherein the aircraft are directed out or in of runways or flight paths which will provide the least annoyance to individuals and communities; another is the climb and descent paths to attain and hold altitude as much as possible. These have been in use for several years now with piston-engine airplanes.

With respect to the terminal area, we are working on blast fences, optimum runup areas and positions, suitable enclosures for passengers among other aspects.

Noise is an extremely diffcult problem to deal with. It is hard to make accurate measurements since noise varies around the aircraft and is affected by temperature, humidity, and wind. We are, however, free of two of the problems of noise which have plagued the military services. One is the use of afterburners; the other is the sonic boom. In addition, we look forward to the ducted-fan engines to come into use within 5 years and these should ease the noise problem to some degree.

In perspective, we have on our hands an extremely difficult problem with jet noise. The CAA and the industry are working on it intensively. Industry hopes to attain the objective of keeping the noise levels for third parties no greater than they are now with piston-engine aircraft. We are not at all sure that this can be accomplished at our present state of knowledge of noise and its suppression. A special study of the impact of noise on the United States air transportaion system was developed and presented by CAA to the jet aircraft and engine manufacturers to urge continued emphasis on jet aircraft noise suppression research and development.

In summary, we in CAA are doing all that we can to keep the levels within public acceptance or toleration limits.

Mr. PLAPINGER. Has your certification of jets been completed?

Mr. PYLE. Mr. Putnam?

Mr. PUTNAM. No, sir.

Mr. PLAPINGER. Does that include any noise standard?

Mr. PUTNAM. No, sir.

Mr. PLAPINGER. It does not.

What is certification addressed to, only safety factors?

Mr. PYLE. Yes, integrity of the aircraft structure, material, and so forth, performance of the aircraft, maintenance, reliability, and things of that kind.

Mr. PLAPINGER. My recollection is when we had our hearings in 1956, there were clauses contained in the various procurement contracts——

Mr. PYLE. That is correct.

Mr. PLAPINGER. Between the airlines, and the airframe manufacturers, to the effect that the aircraft manufacturer would furnish a plane at a noise level no higher than that of the piston-driven aircraft.

Mr. SPANO. That is correct.

Mr. PYLE. That is correct.

Mr. PLAPINGER. Have any jets been delivered to any of the airlines?

Mr. PYLE. The certification—Mr. Putnam, if you will correct me, but the certification of the 707, which will be the first one certificated, is now tentatively set for September 1; and the aircraft cannot be delivered by the manufacturer until they are certificated?

Mr. PUTNAM. That is correct.

Mr. PLAPINGER. What about cockpit visibility? How does this compare with the SAE standard?

Mr. PUTNAM. There has been no change in the Civil Air Regulations on it at this time.

Mr. PLAPINGER. Will you please identify yourself for the record, sir?

Mr. PUTNAM. My name is Putnam, Deputy Director of the Office of Operations and Airworthiness.

Mr. PLAPINGER. You mentioned there has been no change in the Civil Air Regulations on cockpit visibility?

Mr. PUTNAM. No, sir, it is a study that is being looked into by the Technical Development Center at Indianapolis. This is a very difficult problem because it involves windshield strengths and air dynamic effects on the airplane, and many other factors.

Mr. PLAPINGER. What is the standard at present for cockpit visibility?

Mr. PUTNAM. I would have to refer to the regulation. I do not think there is any specific standard other than the angle of visual range. I can look it up for you.

Mr. PLAPINGER. I am interested.

Mr. PYLE. We will submit it.

(The information is as follows:)

[From Civil Air Regulations]

§ 4b.351 *Pilot compartment vision*—(a) *Nonprecipitation conditions.* (1) The pilot compartment shall be arranged to afford the pilots a sufficiently extensive, clear, and undistorted view to perform safely all maneuvers within the operating limitations of the airplane, including taxying, takeoff, approach, and landing.

(2) It shall be demonstrated by day and night flight tests that the pilot compartment is free of glare and reflections which would tend to interfere with the flight crew's normal duties.

(b) *Precipitation conditions.* (1) Means shall be provided for maintaining a sufficient portion of the windshield clear so that both pilots are afforded a sufficiently extensive view along the flight path in all normal flight attitudes of the airplane. Such means shall be designed to function under the following conditions without continuous attention on the part of the crew:

(i) In heavy rain at speeds up to 1.6 V_{s1}, flaps retracted.

(ii) In the most severe icing conditions for which approval of the airplane is desired.

(2) In addition to the means prescribed in subparagraph (1) of this paragraph at least the first pilot shall be provided with a window which, when the cabin is not pressurized, is openable under the conditions prescribed in subparagraph (1) of this paragraph, and which provides the view specified in that subparagraph. The design shall be such that when the window is opened sufficient protection from the elements will be provided against the impairment of the pilot's vision.

[From Civil Aeronautics Manual (revised, January 1958)]

4b.351 *Pilot compartment vision.*

(a) *Nonprecipitation conditions.*

(1) The pilot compartment shall be arranged to afford the pilots a sufficiently extensive, clear, and undistorted view to perform safely all maneuvers within the operating limitations of the airplane, including taxiing, takeoff, approach, and landing.

(2) It shall be demonstrated by day and night flight tests that the pilot compartment is free of glare and reflections which would tend to interfere with the flight crew's normal duties.

(b) *Precipitation conditions.*

(1) Means shall be provided for maintaining a sufficient portion of the windshield clear so that both pilots are afforded a sufficiently extensive view along the flight path in all normal flight attitudes of the airplane. Such means shall be designed to function under the following conditions without continuous attention on the part of the crew:

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4b.351–1 *Procedure for demonstrating pilot compartment visibility (CAA policies which apply to sec. 4b.351).*

(a) *Nonprecipitation conditions.* Such tests as are deemed necessary to show compliance with section 4b.351 (a) should be conducted.

(b) *Precipitation conditions, section 4b.351 (b).*

(1) The operation of the windshield wiper should be checked in actual or simulated precipitation conditions in order to demonstrate that adequate vision is provided for takeoff and landing at speeds up to 1.6 V_{s1}.

(2) The windshield de-icing system should be checked for distribution and operation.

(19 F. R. 4463, July 20, 1954, effective Sept. 1, 1954.)

4b.351–2 *Vision with reverse thrust (CAA policies which apply to sec. 4b.351).* The policies outlined in section 4b.402–1 (g) and (h) will apply.

(20 F. R. 2279, Apr. 8, 1955, effective Apr. 30, 1955.)

[4b.351–3 *Minimum area of visibility in the flight crew compartment (CAA policies which apply to sec. 4b.351 (a)).* The area of visibility established in this section for the pilot, and an equivalent area for the copilot, should be the minimum for showing compliance with the visibility provisions of section 4b.351 (a).

[(a) *Reference eye position.* A single point established in accordance with the provisions of this paragraph constitutes the reference eye position (i. e., a point midway between the two eyes) from which the central axis may be located. The reference eye position is located 5 inches aft of the rearmost extremity of the elevator control device when the control is in its most rearward position (i. e., against the up elevator control stops), see figure 6, and 30.5 inches ±.5 inch above the point of maximum depression of the seat cushion with:

[(1) The pilot seat in a normal operating position from which all controls can be utilized to their full travel, by an average subject, and which will provide for vertical adjustment of the seat of not less than 2½ inches above and 2½ inches below this initial vertical position.

[(2) The seat back in its most upright position.

[(3) The seat cushion depression being that caused by a subject weighing 170 to 200 pounds.

[(4) The longitudinal axis of the airplane level.

[(5) The point established not beyond one inch to the left or right of tne longitudinal center line of the pilot's seat. (See fig. 6.)

[(6) All measurements made from a single point established in accordance with this paragraph.

[(b) *Clear areas of vision.*

[(1) With the reference eye position located as indicated in paragraph (a), and utilizing binocular vision and azimuthal movement of the head and eyes about a radius, the center of which is 3⁵⁄₁₆ inches behind the reference eye position (this point to be known as the central axis), the pilot should have the following clear areas of vision measured from the appropriate eye position with the aircraft's longitudinal axis level. The areas defined are based on the cardinal points of reference listed below and indicated in figure 7. A dual lens camera as photo recorder should be used in measuring the angles specified in this paragraph. Other methods, including the use of a goniometer, are acceptable if they produce equivalent areas to those obtained with the dual lens camera. When not using a dual lens camera compensation should be made for one-half the distance which exists between the eyes, or 1¼ inches as indicated in figure 9.

[(i) 20° forward and up from the horizon between 20° left and 10° right allowed to diminish to 15° up at 30° right (this area unbroken.)

[(ii) 15° forward and down from the horizon between 20° left and 10° right allowed to diminish to 10° down at 30° right (this area unbroken).

[(iii) 40° above horizon between 85° and 95° left.

[(iv) 30° below horizon between 85° and 95° left.

[(v) 20° up and 15° down from horizon at 135° left.

[(2) There should be no obstruction to vision in the area indicated in subdivisions (i) and (ii) of this paragraph and in figure 7. Beyond 20° left the angles indicated in subdivisions (i) and (ii) should remain constant, or increase progressively until they reach the reference angles in subdivisions (iii) and (iv) at 85° and should not be less than indicated in these subdivisions up to the 95° position, at which time they may diminish gradually to the angles shown in subdivision (v) of this paragraph, and should be governed by the limitations of paragraph (d) (2). The area beyond 135°, if any, should be as large as possible since the human eye does not present

any limitation when the use of perceptive rather than binocular vision is the criterion.

[(3) It is possible that in the symmetrical type pilot compartment, there may be an area about the center line of the windshield where the requirements governing pilot and copilot vision areas do not overlap. In this area the angles above and below eye level may diminish due to the increased distance between the appropriate eye position and the windshield, but the windshield dimensions established at the 30° right position, above and below the horizontal plane of the pilot's eye, should be retained. This area should also be governed by the limitations of paragraph (d) (1) and (2) of this section. No attempt is made to define the angles of vision for the pilot, to the right of 30°, since it is assumed that the required vision for the copilot will govern this area. This area not defined by exact limits is indicated by shading in figure 7.

[(c) *Optical properties of windshield.* The windshield should exhibit equivalent optical properies to those covered in MIL–G–8602, dated June 29, 1953, for flat panels, and MIL–G–7767, dated August 14, 1951, for curved panels or any applicable military specifications which may be published subsequent to these specifications. In addition, the optical properties of the windshield should not deteriorate under pressurization loads.

[(d) *Impairment to vision.*

[(1) Any windshield post should not exceed 2.5 inches total obstruction in projected width on the pilot's eyes when located within a sector of 20° and 60° of azimuth to the left of the pilot's forward vision, when measured with head rotated so that the eyes are perpendicular to a vertical plane passing through the center line of the projected width as indicated in figure 8.

[(2) The location of instruments, equipment, or structure should not impair any of the areas of vision established in this section. In addition, cockpit equipment should not obstruct a line of vision from a point two inches above the reference eye position to any point along the upper limit of the forward windshield panels, and similarly, a line of vision from a point two inches below the reference eye position to the lower limit of the forward windshield panels.]

(22 F. R. 7359, Sept. 14, 1957, effective Sept. 20, 1957.)

CIVIL AERONAUTICS BOARD, BUREAU OF SAFETY, WASHINGTON, D. C.

Annual Review, Airworthiness Civil Air Regulations

Meeting, September 1958—Agenda

(DRAFT RELEASE 58–1B)

10c. Pilot compartment vision (submitted by the CAA)

Supporting discussion: The present wording of this section could be interpreted as merely requiring sufficient vision to perform the specified maneuvers in an isolated airplane without regard to the avoidance of other aircraft. We believe adequate vision for collision avoidance is of prime importance to safety and recommend that it be specifically covered in the regulation.

Specific proposal: Amend section 4b.351 (a) to read: "The pilot compartment shall be aranged to afford the pilots a sufficiently extensive, clear, and undistorted view to permit the avoidance of other aircraft and to perform safely all maneuvers within the operating limitations of the airplane including taxiing, takeoff, approach, and landing."

Comments received on proposal

AIA: "If it could be shown, with any degree of credibility, how the addition of these words will help in the solution of the collision problem, we would support this amendment 100 percent. Even if these words were interpreted to mean that a closed television circuit should be installed in the airplane to give the pilot a completely unobstructed view for 360° in both azimuth and elevation, it is doubtful if a noticeable reduction in the collision rate would result. The pilot has only 2 eyes placed in the front position of his head, and can look in only 1 direction at a time. Even if he were alert 100 percent of the time, the odds are 5 to 1 against his looking in the right direction at the right time. The odds against his seeing

the other aircraft and of being able to take proper evasive action in time to avoid collision are further compounded.

"Most collisions have occurred when visibility conditions were favorable and in uncontrolled traffic areas. Probably the most significant fact in collision statistics is the absence of collisions in control zones where air traffic is the most congested. Such high-density areas where traffic is controlled are conspicuous by their absence from the roster of collision locations.

"All of the evidence, both in regard to collisions in the airport traffic pattern and en route, point toward the need for better traffic separation. Significant in this respect is the fact that in about 75 percent of all collisions involving transport airplanes, the second airplane has been a nontransport. With one exception, all collisions within the airport traffic pattern have occurred between transport and nontransport aircraft. These collisions could not have occurred with proper traffic separation.

"Contrary to the implication of this proposal (that transports have been designed in complete disregard to the problem of 'avoiding other airplanes' in flight), curent transports have been designed to give the greatest visibility which the many complex and conflicting design requirements in this area will permit. By the very nature of the problem, further design progress in this field is apt to be slow. Continued emphasis on this problem constitutes little more than harassment of the designers who are doing everything within their ability at the present time, taking into account bird-proofness, fail-safe design, pressurization, aerodynamics, and location of instrument panel as well as increased visibility.

"We recommend that this proposal be deleted from the agenda."

Navy: "The Bureau of Aeronautics concurs in this proposal."

ALPA: "Acceptable."

CAA: "In order to settle controversies concerning the minimum angles of vision required under Civil Air Regulations 4b.351 (a), we wish to add the following to the previous CAA proposal for section 4b.351 (a):

"'With the airplane in level flight, clear areas of vision from the first pilot's eye position shall be at least as follows, and clear areas of vision from the second pilot's eye position shall be the same with right and left interchanged:

"'(1) 20° forward and up from the horizon between 20° left and 10° right, allowed to diminish to 15° up at 30° right; this area shall be unbroken.

"'(2) 15° forward and down from the horizon between 20° left and 10° right, allowed to diminish to 10° down at 30° right; this area shall be unbroken.

"'(3) 40° above horizon between 85° and 95° left.

"'(4) 30° below horizon between 85° and 95° left.

"'(5) 20° up and 15° down from horizon at 135° left.'"

NATA: "Regarding item *10c*, while this is not in our category of aircraft, we feel that it is about time some steps were taken by Government in the discharge of their responsibilities to prevent current and future designs from being consummated that would ever again enable the type of visibility in a transport aircraft on the order of that found in the Constellation, for example."

ATA: "This proposal is worded in such general terms that interpretation of limits could not be made. Unless a definite sphere of surveillance is prescribed, the proposal would be valueless."

FEIA: "FEIA supports the CAA's position in regard to cockpit visibility. The visibility found in present transport aircraft is laughable when compared with that found in other transport vehicles, such as locomotives, steamships, buses, etc. Many of the design problems associated with cockpit visibility (on larger, four-engine equipment) are brought about by attempts to place the powerplant and system instruments and controls on the forward (pilots') panel. This can be particularly true in respect to three-abreast cockpits. The placement of large, overhead system panels and complete powerplant instrument panels on the forward area of the cockpit cannot help but reduce size and numbers of windows and windshields. Fuel and oil quantity gages, fire-fighting instruments and controls reduce the size and quantity of these apertures even further. To eliminate this impossible problem for the designer, FEIA suggests that, on the larger, more complex, multiengine aircraft, there be a measuring stick beyond which there will be a complete flight-engineer station. This will give the designer an opportunity to design a cockpit with adequate visibility and at the same time provide the flight crew with a separate station for the flight engineer so that he might perform his duties in the most efficient manner.

"Specific proposal: Section 4b.351, subparagraph (a). To insure that there will be ample space in the cockpit for windows and windshields of sufficient size

and quantity to provide adequate cockpit visibility, all 4-engine aircraft weighing more than 80,000 pounds will be designed with a separate flight-engineer station.

"NOTE. Because the hazards of collision seem to increase each year with the increase in the number and speed of aircraft on the airways, the need for greater rearward visibility has become a necessity. It would appear the aviation industry could well adopt the practice used in almost every other mode of transportation and supply the pilot flying the aircraft with a view of the area behind him. This could be done by a simple system of rearview mirrors or other reflecting devices. It is most probable that any movement visible in a view of the area behind the aircraft would attract the pilot's attention and thereby warn him of possible approaching danger. Such a system of mirrors would supply the pilots with this necessary information."

Mr. PLAPINGER. In the report of the Air Force Accident Investigation Board on the Brunswick crash, one of the possible causative factors included was—

Cockpit visibility restrictions in the Viscount and difficulty in observation from the T–33 at wide starboard angles contributed to inadvertent collision.

In understood that some representations had been made to the CAB concerning this matter. I wondered how the 707, for instance, compares with other aircraft?

Mr. PYLE. Just from my personal observation, Mr. Plapinger—I have flown in the airplane and also flown a prototype, myself—it has improved considerably over the present piston-driven aircraft. However, we can submit for the record, Madam Chairman, a comparison to the SAE, which I think is the point that you asked——

Mr. PLAPINGER. Yes.

Mr. PYLE. Initially of Mr. Putnam.

Mrs. GRIFFITHS. Please do so.

Continue.

Do you have any more questions?

Mr. PLAPINGER. I do not.

Mrs. GRIFFITHS. Mr. Pyle, you may continue.

Mr. PUTNAM. We have the regulation here, if you would like to read it, on cockpit visibility.

Mr. PLAPINGER. Is it long? Why do you not submit it for the record?

Mr. PYLE. We will submit it as part of our statement.

Mrs. GRIFFITHS. Yes, we will be very happy to have it.

You may continue, Mr. Pyle.

Mr. PYLE. The Civil Aeronautics Administration, with a civil service standards specialist participating, has completed an intensive study of the position content and relationships existing in the field of air traffic control. This was accomplished by a series of panels composed of working level field control personnel in each of major specialities—center, tower, and station. The recommendations of these panels have been consolidated in a final agency proposal for the revision of classification allocation standards.

Mr. PLAPINGER. What is a "classification allocation standard"?

Mr. PYLE. Mr. Dixon will answer that. He is in our Personnel Department, and I think can give a concisive definition.

Mr. DIXON. Well, this is a series of what amounts to specifications which are put out by the Civil Service Commission for guidance in various occupational areas for the allocation of jobs in the classification system.

Mr. MINSHALL. Personnel?

Mr. PYLE. Personnel officer.

Mr. PLAPINGER. You mean this determines how many jobs you are entitled to, determined by workload?

Mr. DIXON. No, it is merely a grade of the position, grade established for merely a set of duties.

Mr. PLAPINGER. I see.

Mrs. GRIFFITHS. Mr. Pyle, you may continue.

Mr. PYLE. These recommendations have been concurred in by the Department of Commerce and the formal presentation of this package was presented on July 17, 1958, to the Civil Service Commission. We are hopeful that we will have a final acceptance of this proposal in the near future. We feel we have done everything within our power to enable the Commission to reach a final decision on this proposal at a very early date.

Mr. PLAPINGER. Is this the same one you have been working on since 1953?

Mr. PYLE. Yes, it is.

I would like to point out in this connection, Madam Chairman, that in my opinion our people have done an excellent job in this area, because it became an extremely difficult problem to get across to the Civil Service Commission exactly what we were doing in spite of repeated efforts on our part. There was a certain reluctance to get down and really find out what we were doing.

I do not criticize them necessarily, but it did slow the thing up.

Thanks to the efforts of Mr. Thomas and the Personnel Department, we finally were able to get across to them what was being done. We took them in airplanes, we took them around the country and we got our own people in and worked as a panel of experts—not at the management level, but at the working level. We actually got this thing down to the point where I think we are going to get it done.

Mrs. GRIFFITHS. Yes, Mr. Thomas.

Mr. THOMAS. I would like to clarify, the action started in 1953 actually culminated in a reclassification, which was effective January 15, 1956. So there was an intervening step. There was some action taken in 1956. We were not satisfied with that action, however——

Mr. PLAPINGER. You must be awfully tired, Mr. Thomas, after all these negotiations.

Mr. THOMAS. It is a continuous job, sir.

Mr. PYLE. But, quite frankly, we are as concerned as the committee has been on this problem. I do feel now we are on the home stretch at long last.

The Civil Service Commission has really turned all out lately to help us in this area and I think we have the job done. I certainly hope so.

Mrs. GRIFFITHS. Mr. Pyle, you may continue.

Mr. PYLE. We are currently using qualification standards approved by the Civil Service Commission on December 6, 1956, and these are the standards to which Mr. Thomas just referred. These have provided us with an ample supply of candidates with reasonably satisfactory qualifications. As a part of the current classification allocation standards project, these qualification standards will be reviewed and revised as necessary. We do not contemplate any major changes at this time, nor do we anticipate any difficulty in getting the minor

changes necessary to conform the present standards to any new grade levels resulting from the current allocation standards project.

As an example of our ability to recruit, we have been able to recruit sufficient air traffic control personnel to enable us to obtain all necessary replacements and accomplish a net increase of 1,689 employees during the period May 31, 1957, to May 31, 1958. This recruitment total represents virtually all of the positions which could be financed under the agency's budget. We have consistently been able to staff this area to the maximum limits of our financial and training limitations.

The workload of the air traffic controllers is a source of constant concern to the CAA and considerable study is being given to such items as providing lunch periods and short rest periods for controllers.

Mr. PLAPINGER. Mr. Pyle, does that mean you do not provide lunch periods for your controllers?

Mr. PYLE. No.

Mr. THOMAS. No, sir; there is no provision for any lunch period or any period of relief.

Mr. PLAPINGER. There is no provision for lunch period?

Mrs. GRIFFITHS. Within the working day?

Mr. THOMAS. Within the working day.

Mrs. GRIFFITHS. What is the working day?

Mr. THOMAS. Eight hours.

Mr. PLAPINGER. Do you mean a controller is expected to work 8 hours straight?

Mr. THOMAS. Yes, sir; he is expected to work 8 hours straight, and overtime is not unusual.

Mr. PYLE. I thinks perhaps, Madam Chairman, if we just continue this, it would set it in the proper context and we could discuss it further.

There is a serious operational problem with which the controllers themselves concur.

The type of operation and the fact that this requires additional staffing makes this problem a difficult one. The controller cannot leave his job in the sense that most employees can. The traffic control situation almost invariably requires that a relief controller will have to spend considerable time in familiarizing himself with the traffic control situation before taking over and that the relieved controller must spend a like amount of time in analysis of the current control situation before he can reassume control responsibility. The agency is quite concerned about this matter and is attempting to explore all avenues which will provide much-needed relief from the exercise of continuous control responsibility.

Mrs. GRIFFITHS. Now, how does he know the traffic situation at an airport, on a radar setup? Or does he have it in his head where each of these planes is? Where? How does he know it?

Mr. PYLE. Mr. Thomas.

Mr. THOMAS. Madam Chairman, there are quite a number of ways that he does know.

At the locations where we have radar, this is just one of the methods. He gets flight plans, advance flight plan information; he gets information transferred to him from adjacent control facilities that inform him of the anticipated traffic that will be coming into his area. He must be familiar with the weather conditions. He must be familiar with the arrangement and operating condition of each of the air navi-

gational aids which he is concerned with. He must know the general performance characteristics of each of the aircraft and their ability to comply or not comply with general facilities. So there must be an exchange of information between a controller going off duty and a controller coming on as to the exact traffic status, to the extent each aircraft has been cleared or not been cleared, what the delays are, load restrictions, and all the other information which is necessary.

Mrs. GRIFFITHS. I can see this.

Is he carrying all this in his head?

Mr. THOMAS. He is carrying it in his head to a degree, but all the essential information is posted available immediately in front of him in chart form, notations on flight progress strips, and other information.

Curiously when we first started into the computer business, we found that we took the capacity of most of the average business machine computers just to store in its memory what the controller has in his memory, and left very little room for computation.

Mr. PLAPINGER. All that machine needs is an oiling; this fellow does not even get lunch. [Laughter.]

Mr. THOMAS. That is right.

Mr. PLAPINGER. Do you make any provision in your budget request for relief personnel?

Mr. THOMAS. No, sir. We have not been able actually to keep up with the traffic as it is expanding.

We now have a contract—and I believe this will be mentioned later on—by which we are looking into hours of duty. For example, we are not at all sure that 8 hours is a proper workday for a controller watching radarscope.

Mr. PLAPINGER. Mr. Thomas, do you eat lunch?

Mr. THOMAS. Yes, sir, I do, but I have spent many hours in a control center without it.

Mrs. GRIFFITHS. How long does it take a new controller coming on to familiarize himself with the situation?

Mr. THOMAS. An experienced controller?

Mrs. GRIFFITHS. Yes, experienced.

Mr. THOMAS. About 15 minutes.

Mrs. GRIFFITHS. And, of course, that would apply, then, if the other one came back from lunch, it would take him 15 minutes?

Mr. THOMAS. Yes.

Mrs. GRIFFITHS. It seems that would be awfully easy, to stagger some people.

Mr. THOMAS. Well, Madam Chairman, our difficulty is this, at many of the locations there are only 1 or 2 people on duty for an 8-hour period of time. This means you would have to have another person on duty in excess to come out to relieve say for two half-hour periods, which creates a difficult program.

At some of our larger facilities where we may have 70 or 80 people on duty at 1 time, we do make some provision for staggered hours and some lunch periods; but we could not, for example, run 50 people out to Washington National Airport to provide a lunch relief and go back home. This is one of the problems.

Mrs. GRIFFITHS. What is the top salary paid the top controller, for instance, at an airfield?

Mr. THOMAS. I could answer that before the pay raise. I would like to defer to Mr. Dixon.

The top working controller would be a grade 11 and the new grade 11 would be what?

Mr. PLAPINGER. That is around $7,500.

Mr. PYLE. More than that I think.

Mr. DIXON. The entrance salary under the current Classification Act is $7,030 a year.

Mrs. GRIFFITHS. $7,030?

Mr. PYLE. Grade 11.

Mr. DIXON. That is right. It goes up to $8,230 on a longevity basis.

Mrs. GRIFFITHS. What is the turnover of personnel?

Mr. THOMAS. The turnover in personnel in this field? Actually it is surprisingly low considering the responsibilities they have. It has been running about six-tenths of 1 percent a month, or slightly less than 10 percent a year. And this is lower I think by far than the average Government turnover.

Mrs. GRIFFITHS. What does it cost you to train one of them?

Mr. THOMAS. In terms of cost—I do not know that we have calculated this precisely, it takes 18 months to 2 years.

Mrs. GRIFFITHS. To train one?

Mr. THOMAS. To train one. And we pay him grade 6 to begin with. So we have his salary. We have the overhead of the Aeronautical Center at Oklahoma City, and we have the overhead at 70 training locations over the country for advanced training. So I would guess—my guess would be $20,000 or $25,000 training cost.

Mr. MINSHALL. Do these same figures generally apply to tower operators as well, as far as pay and work hours?

Mr. THOMAS. We are considering both groups.

Mr. PLAPINGER. How does this compare with overall Government turnover?

Mr. THOMAS. I would like to check with Mr. Dixon, but 2 percent per month, would that sound right?

Mr. DIXON. That is right; this is roughly half.

Mr. THOMAS. A little less than half than the average.

Mr. PLAPINGER. Do these people have any facilities for any vending machines near by?

You can see this has shaken me. I thought that this was a misprint when I read it.

Mr. THOMAS. No, sir; this is not. This depends. At our larger facilities, we do have vending machines for coffee, cokes, sandwiches, ice cream, and so forth. Most of the people are by necessity required to carry their lunch.

I know many who do it now, carry lunch, have no opportunity to eat it and carry it back home at night, because of the traffic runs.

Mrs. GRIFFITHS. That is terrible.

Mr. PLAPINGER. There were news items about the Brunswick crash concerning the breakdown of one of your people out here.

Mr. PYLE. Yes, sir; that is correct.

Mr. PLAPINGER. I can almost understand why after this sort of thing.

Mrs. GRIFFITHS. What is the total amount of cost of controllers to the Government?

I am asking for the total cost of all the controllers. How many controllers do you have?

Mr. THOMAS. We have right at the moment around 12,000, and this is being expanded; under our presently authorized budget this year, we will add another 4,000, so we will have 16,000. Our average grade I believe is 9.2 or 9.3, so it would be 12,000 times a grade 9. What would that be? Around $6,500?

Mr. DIXON. $6,000.

Mr. THOMAS. $6,000.

Mrs. GRIFFITHS. 16,000—$96,000.

Mr. THOMAS. For the controllers alone, it would be around $72 million.

I think actually our total operating cost is somewhat higher than that. It would be closer to $100 million by the time we include travel and other objects of expenditure.

Mrs. GRIFFITHS. If we had that $250 million back the Defense spent for TACAN, we would be able to pay them.

Mr. PYLE. Madam Chairman, I would like to make one point here. We are not satisfied that this is the answer, the proper way to do it. We come into actually further description of the study, we are very concerned about it, just as you are. On the other hand, I would like to say this, I think these boys, men and women, in the facilities—and there are a considerable number of women, too, doing it—are all doing a terrific job. I think they deserve—I would like to put it on the record how proud I am of the job they are doing.

Wherever there is a facility, I go in, and make it a point to go in there, and see how the morale is. And it is uniformly high.

Mrs. GRIFFITHS. Yes, of course.

Mr. PYLE. This is a credit to this group.

Mrs. GRIFFITHS. They are doing a tremendous job. Obviously they feel necessary and important, as they certainly are.

Mr. PYLE. Both to civil as well as military aircraft.

Mrs. GRIFFITHS. Which adds greatly to the fact they must feel compensated to some extent in that way. But it is a shame that they have such working conditions.

Now, perhaps they are not doing the complaining they should do; probably too tired to complain. [Laughter.]

Mr. PYLE. I think the point that we must leave with you is simply this: we are not by any means going to sit back and be content with the situation.

Mrs. GRIFFITHS. No.

Mr. PYLE. We are trying to correct it. This is an obligation to the job they are doing.

I think we also have to be realistic. We have a responsibility to the taxpayer.

It would be real easy to say we will increase our employment by 30 percent and provide the relief, but there is another $30 million we are asking the taxpayer to pay out.

So we have a problem; how do we solve this problem with equity to the controllers and at the same time not be just extravagant in the expenditure of public funds? This is a problem.

Mrs. GRIFFITHS. Mr. Pyle, you may continue.

Mr. PYLE. As you know, we are currently engaged in the relocation and modernization of our air route center locations. In the design of the new center locations, every effort has been made to set up optimum working conditions consistent with security requirements. Similar efforts will be made in any other facilities which are modernized or in any new facilities which are built. The agency has recently adopted new space standards for air traffic control towers as an example.

And I believe yesterday we showed you a picture of the new center buildings that are being designed, very functional and with due regard to the working condition problem.

The general analysis of working conditions is also under study at the moment. This study is being done by contract let to the National Flight Safety Foundation. One of our major concerns is that the physical requirements for our control personnel are adequate to protect the flying public but are not so stringent as to work any unnecessary hardships on our controller personnel.

Mr. PLAPINGER. When was this contract let, Mr. Pyle?

Mr. PYLE. Mr. Thomas.

Mr. THOMAS. Mr. Plapinger, it was let, I believe, in the early part of May of this year.

Mr. PLAPINGER. How much is it for?

Mr. THOMAS. $60,000 or thereabouts.

Mr. PLAPINGER. And when is it supposed to be completed?

Mr. THOMAS. We will get a preliminary report in October.

Mr. PLAPINGER. And the final report?

Mr. THOMAS. And final report by the end of this year is my recollection.

Mr. PLAPINGER. Is the National Flight Safety Foundation Dr. Lederer's organization?

Mr. THOMAS. Yes, sir. It involves a great deal of physical measurements of stress we have not heretofore had. Looking into the working environments, how long can a man watch a radarscope, and try to come up with some reasonable determination?

Mr. PLAPINGER. I see. This is not concerned with physical requirements of the centers themselves?

Mr. THOMAS. No, this is the physical fact of humans.

Mr. PYLE. Human engineering I think is the proper definition.

Mr. THOMAS. Should he work 6 hours?

Mr. PLAPINGER. Good.

Mr. PYLE. It is not an actual fact, Mr. Thomas, this is a continuation of a previous project that Mr. Lederer undertook for us in this area and did such a fine job that we asked him to come back and go further into the problem?

Mr. THOMAS. Yes; that is correct.

Mr. PYLE. We have had an initial report already on it in this area.

This project has been expanded, however, to an investigation of the overall working conditions confronting our controller personnel, and we are eagerly awaiting the results of this survey and the recommendations of the foundation.

Madam Chairman, are there any other points on this area?

Mrs. GRIFFITHS. Mr. Meader.

Mr. MEADER. I am trying to find in our hearings 2 years ago reference to this matter of traffic controllers.

Was your turnover rate greater at that time than it is now?

Mr. THOMAS. Mr. Meader, I believe there has been very little change in our turnover rate. It might have been slightly greater at that time than it is now.

Our big problem has been expansion. Of the 12,000 people I mentioned, they are not all expert controllers by any means yet. Many of them are in the state of training. And the big burden is shouldered by the hard core of experienced controllers who are carrying really more than their share of the load now until our training catches up with our requirements.

Mr. MEADER. I vaguely recall some complaint that the Air Force was "pirating" some of your controllers at that time.

I thought, if there were a larger turnover rate then than at present, discontinuing that pirating may account for it.

Mr. THOMAS. Sir, that was not large in number, but it hurt us in the experience level because it did take some number of highly experienced controllers. However, that has been stopped and, as a matter of fact, the reverse situation is true now. Our biggest source of recruitment actually is from military controllers and military pilots who have completed their tours of duty. They normally would gravitate to us. They are very fine, and we are very glad to get them.

Additionally, we have recovered some of the controllers, civil controllers, who did go to the military during that period and are now back with us. In fact, one reported to my office yesterday.

Mrs. GRIFFITHS. What other type of job does this experience prepare a controller for? To whom do you lose controllers?

Mr. THOMAS. We are having a survey now trying to find out where the controller goes when he quits, and we are losing some.

Their experience does not generally fit them for any other type of job, with limited exception. They can serve as consultants to contractors who are working in this area; they can work with the air transport associations or airline specifically in this area, or they can work to some degree with the military. This is a very small demand, though, in comparison to the total number.

Generally we find—and we have had this situation—they just say they are plain tired; they cannot stand another day of it; and they go out and sell hardware or insurance.

Mrs. GRIFFITHS. Skid row.

Mr. THOMAS. Or anything else.

Mrs. GRIFFITHS. Do you have any other questions?

Well, thank you very much.

Mr. THOMAS. Madam Chairman, there is another paragraph.

Mrs. GRIFFITHS. Oh.

Mr. PYLE. The Airways Modernization Board has underway an extremely intensive program in those areas of research and development assigned to it by Congress. It is working in very close cooperation with the Civil Aeronautics Administration. In fact, we have many personnel of the CAA actually working with the AMB, either as their personnel or on detail to them from our offices. Their program is very comprehensive, and that agency is pushing it forward with all possible speed.

Because of the complexity and scope of the work of the AMB, we believe that it would be better if the description of its activities came directly from them, since we understand that they have been invited to participate in these hearings. We, therefore, defer to that agency on this subject.

I would, however, Madam Chairman, just like to add that the relationship is extremely close. In fact, I do not think a day goes by or even half a day goes by that I am not in touch with either one of their staff members or with Mr. Quesada himself on mutual problems. It is a team effort from the word go. We cannot get there any other way.

They are responsive to our requirements. Sure we have lots of good arguments, but this is what makes progress.

I think it is carrying out the mandate of Congress in exemplary fashion and I am all for it. I think they are doing a good job, and the end result of their work will be coming out fairly shortly. It will be materially helpful to the solving of the whole problem.

As you know, their responsibility, as General Curtis described it, was in phase 2 of the interim research and development area, and the long range in both areas. They are working hard. Our responsibility is to get on moving the traffic today and inservice improvement on what we have in our system. And this is being worked out very satisfactorily.

Mr. PLAPINGER. How are research projects generated? Are there any specific projects that the AMB has under way right now that have been generated as a result of the request by AMB?

Mr. PYLE. Perhaps Mr. Thomas or Mr. Tippets would like to comment, but it is my general impression it is so difficult to say who does what to whom, because we work so closely together.

In other words, there is a requirement for improvement, let's say, in the computer area or——

Mr. PLAPINGER. How does AMB know about that? Is it because CAA tells them?

Mr. PYLE. CAA tells them; they know about it themselves, their own staff. We work together in general on the requirements.

I would be less than candid here if I said we specifically sent a bill over there and said to go work on this. We work together.

Mr. PLAPINGER. Have you ever sent a specific subject over there and said, "Will you please do some work on this?"

Mr. TIPPETS. Well, Mr. Plapinger, for a moment let's look at one of their biggest projects. They have consulted with us, we have held briefings with them and they with us, on areas of deficiencies in research and development for air traffic control and air navigation. They called in the pilot groups; they called in other user elements. As a result of all this, the AMB have embarked on a rather major contract with the GPL—General Precision Laboratory—for a data transfer and display system in the New York area. This will be a cooperative program. They will do the research and development program and we will furnish the input for cooperative requirements on this.

They are making studies of slant airways and parallel airways. They have embarked on a program in Atlantic City where the major laboratory will be for experimentation, and here again they consult with us on deficiencies or areas where we would like to have improvement. They go to all these groups and put all these inputs together and come up with a project, and get clearance from us as well as other groups.

Mr. PLAPINGER. Has there ever been any instance in which you have asked them to go into a subject which they have felt did not merit their research?

Mr. PYLE. I know of none.

Mr. TIPPETS. No.

Mr. PYLE. I know of none.

Let me give you other examples specifically with which I am familiar.

This whole airport lighting area I have felt very strongly about. We work in this area, too, but in cooperation with the Airways Modernization Board, and the project is under their direct guidance.

Now, this is something we initiated. We turned it over to them.

Another good example is the anticollision problem. This is very properly in their area. We are encouraging them in this area. The major work done in this area was by the Air Transport Association and by the Air Force. Now, this is a high priority project under AMB guidance; this is where it belongs. We are urging them to get on with it.

Mr. PLAPINGER. Let me go back to the statement again for a minute if I may, Madam Chairman.

Mrs. GRIFFITHS. Yes.

Mr. PLAPINGER. On page 2, you say:

> The Air Coordinating Committee's VORTAC recommendation, adopted on August 30, 1956, outlined courses of action.

I assume that recommendation was made in a document and I think that our files would be more complete if we could have a copy of that document.

Mr. TIPPETS. Yes, sir; we would be glad to furnish it.

Mr. PYLE. Yes.

Mr. PLAPINGER. On down in the third paragraph on that page, you say that there were 27 VORTAC installations installed as of June 30, 1958. There were four the middle of June.

Do I properly conclude from that that between the middle of June and the end of June there were some 23 stations installed?

Mr. TIPPETS. Yes, sir. This is a progressive thing, Mr. Plapinger. We get the beacons, install them; get the antennas—these come from different manufacturers—the cumulative effect occurred in June. We were shooting for a target of so many by June 30 and we made this target, with the exception of some control and monitor equipment we mentioned yesterday.

Mr. PLAPINGER. On page 3, you say:

The ACC * * * agreed that funding of this program could be deferred for 2 years.

Are you required to submit your budget to Air Coordinating Committee?

Mr. TIPPETS. We are not required, no, sir; but we have, as a cooperative arrangement with the airspace users and other segments of Government, submitted the programs to them for coordination, not for decision.

Specifically we were talking here about whether to divert funds, diverting them to VORTAC rather than ILS/TAC. We took that to them for their support of the program.

Mr. PYLE. If I could speak to that point for a moment——

Mr. PLAPINGER. Yes.

Mr. PYLE. I think the point here is we have the responsibility to the users. This is a convenient forum in which to lay out our programs and be sure we have not overlooked anything. We have to be awfully careful we are meeting their requirements—military, civil, general aviation—and they are all represented on this forum of ACC, industry included.

Mr. PLAPINGER. Could you furnish for the record the results of the accelerated modernization plan comparing what was in the December 1955 airways modernization plan with respect to facilities that we would ordinarily have had by July 1 of this year, as against what we have now as a result of the acceleration of that plan? Do I make myself clear?

In December 1955, you proposed a plan, the airways modernization plan, based on X million dollars. It was outlined in the plan that by such-and-such a date—July 1, 1958, if you will—you would have so many facilities in the system. But shortly after that, the CAA received additional appropriations under the guise of accelerating the program. We would like to know just what effect that accelerated program had with respect to facilities in existence now.

Mr. TIPPETS. We can make a very fine table on that.

(The information is as follows:)

RESULTS OF ACCELERATED MODERNIZATION PLAN

CAA facility implementation schedule—Original and accelerated plans compared

Description of item	L. R. Radar	ASR	Center A/G Com. Sites	Towers	VORTAC	VOR	ILS	ALS
A. Facilities funded prior to plan	3	45	1	194	[1] 432	[2] 498	170	23
B. Additional facilities funded in fiscal years 1957 and 1958:								
1o. Original plan, at original costs	40	17	42	22	[1] 221	155	15	[3] 77
1r. Original plan, at revised costs	19	13	42	20	72	108	12	48
2. Accelerated plan, revised costs	37	17	323	30	346	[2] 136	25	70
C. Facilities completed June 30, 1958:								
1. Original plan (from line B1r)	13	0	42	5	0	54	0	14
2. Accelerated plan, actual	13	0	197	5	27	54	0	14
D. Facilities completed June 30, 1959:								
1. Original plan, estimated	19	3	42	20	72	82	0	44
2. Accelerated plan, estimated	37	[4] 3	323	27	258	82	[4] 0	44

EXPLANATORY NOTES

Line A shows the number of major types of facilities funded prior to the fiscal year 1957 appropriations. Some of these facilities became operational only during the past 2 years.

Line B1o shows the number of major new facilities which would have been financed from the $104,000,000 to be appropriated during the 1st 2 years of the original December 1955 Federal airway plan.

Line B1r shows how increased unit costs (due to improved capabilities of radar, improved operating techniques, and the adoption of VORTAC as the standard short range navaid) reduced the number of facilities which could have been financed from the $104,000,000 to be appropriated under the original December 1955 plan.

Line B2 shows the number of improved new facilities financed as a result of the accelerated plan whereby $221,000,000 was made available to CAA during fiscal year 1957 and fiscal year 1958.

Line C1 shows how many of the improved types of new facilities, financed by the $104,000,000 in the original plan, would have been physically completed by June 30, 1958.

Line C2 shows that few additional facilities (except for 27 VORTACs and 197 remote air/ground communication sites for control of air traffic by center personnel) have been completed as yet due to the accelerated plan.

Lines D1 and D2 show the facilities estimated to be completed on June 30, 1959, under the original and accelerated programs, respectively.

[1] VORs backfitted with DME rather than with TACAN.

[2] Nearly all of these VORs will have distance capability added.

[3] Includes 49 short systems subsequently doubled in length.

[4] Delivery of remaining ASRs and ILSs starts in mid-1960.

Column headings: L. R. Radar (Long Range Radar), ASR (Airport Surveillance Radar), Center A/G (Air/Ground) Communication Sites, VORTACs (Very High Frequency Omnirange with Tactical Air Navigation added), VOR (Omnirange), ILS (Instrument Landing System), ALS (Approach Lighting System).

Mr. PYLE. I would like to point out it may have to be somewhat theoretical because, of course, as time goes on, you change. But basically I think we can show this. I think it would make a good exhibit.

Mr. PLAPINGER. During our May hearings, there was a reference to 4 radar systems in existence and 4 more to be installed; have those additional 4 long-range radar systems been installed?

Mr. TIPPETS. Yes, sir. We now have 14 in operation, not all commissioned. They are in various stages of operation, training the personnel, both maintenance and traffic controllers for their commissioning.

Mr. PLAPINGER. I see. Let me just for a few minutes address ourselves to CAA 60–9 in which you were delegated authority over the airspace.

What has been done by CAA in this field? And by that, I mean have you asked the users of restricted or reserved airspace to justify their continued need for such reservation or restriction?

Mr. THOMAS. Mr. Plapinger, we have not in blanket form done this. We are now in a process of reviewing the use of existing restricted airspace and, contrarywise, the necessity for additional restricted airspace, as a result of our team efforts.

The air traffic control supervisors in the field of segregation of traffic, which was dealt with in Mr. Pyle's testimony, are making a base-by-base review together with all related activities and their airspace requirements. They are looking toward either increasing or decreasing areas or joint use of restricted areas or part time use.

This is now underway but we have not asked for formal—at the moment at any rate—written statements for each one, because we believe this is something we need to go see and actually discuss on the spot.

Mr. PLAPINGER. Now, I understand with respect to specific applications for restrictions right now that you use the ACC as your forum.

Mr. THOMAS. That is correct.

Mr. PLAPINGER. Recently this matter came to the attention of the committee. In the north-central area of the United States, it looks like it includes a good deal of Wisconsin, half of Michigan and half of Illinois and Indiana, for 7 weeks, 4 days a week, between August 20 and October 17, from 1 a. m. to 4 a. m. there will be no commercial flights permitted.

Mr. THOMAS. That is correct.

Mr. PLAPINGER. Could you tell us what the purpose of this restriction is?

Mr. PYLE. Madam Chairman.

Mrs. GRIFFITHS. Yes.

Mr. PYLE. I am afraid we cannot except in executive session.

Mrs. GRIFFITHS. I see.

Mr. PYLE. This is a highly classified operation.

Mr. PLAPINGER. In connection with this designation of restricted area, the Air Space Division made a recommendation.

Is that the form in which these applications usually are handled, the form used is the Air Space Panel of the Air Coordinating Committee?

Mr. PYLE. I think it might be appropriate, Madam Chairman, at this point to explain that we have radically, or to a great extent, revised the whole procedure of handling of airspace matters within the ACC. I would, if it meets with your approval, like to submit new procedures that are followed with respect to this particular problem.

Mr. PLAPINGER. New since when, Mr. Pyle?

Mr. PYLE. They have been effective since they were occasioned by this new regulation. I think it is part of our response to your question. We have revised the procedures of the Air Coordinating Committee, we have reconstituted the Air Space Subcommittee as a separate division insofar as the handling of allocation of airspace is concerned. I am the chairman of the committee for those particular matters. We have appointed an Assistant Administrator for Air Space whose sole responsibility is to handle airspace matters.

Mr. MEADER. By "we," you mean CAA, not ACC?

Mr. PYLE. That is correct.

Now, I may have answered you incorrectly; when you said "by 'we' "——

Mr. MEADER. You said, "We have appointed a special assistant for airspace."

Mr. PYLE. CAA, yes; special assistant reporting directly to me on all airspace matters.

Mr. PLAPINGER. What I was concerned with here is the airspace panel now sitting as an airspace division making a recommendation to you.

It was our understanding in our hearings in May of this year that this was merely a forum——

Mr. PYLE. That is correct.

Mr. PLAPINGER. Used by the Administrator. There were to be no findings. But here we find there are recommendations.

I would like to ask one other question; and that is, knowing the composition of the Air Coordinating Committee, I am curious to know whether the agency whose application was before you also had a representative on this airspace panel who voted to make this recommendation?

Mr. PYLE. Well, I think the basic point—and it is a good one—to which you refer is this:

They make recommendations. They can make recommendations; the decision is mine. I can go along with the recommendations or I can overrule them.

Mr. PLAPINGER. I understand that. It is your responsibility to make the decision. Why should they be permitted to make a recommendation to you?

Mr. PYLE. Well, I feel it is important that we get all the views of users of the airspace.

Mr. PLAPINGER. It is all right to get all the views, but we were told specifically by the CAB that the ACC would make no findings.

Now, maybe technically they are making no findings; they are making recommendations.

Mr. PYLE. I think this is a point, and I am glad to have them, but I will pay attention to them or not as I see them.

Mr. PLAPINGER. You would not be content merely to have their views expressed on the record?

Mr. PYLE. This is expressing their views, but making recommendations.

Mr. PLAPINGER. This is the airspace panel.

Mr. PYLE. Is this regional or Washington?

Mr. PLAPINGER. I understand this is Washington.

Mr. BOYLE. It works both ways, Mr. Plapinger. The Regional Space Subcommittee can make a recommendation to the Washington Division, and the Washington Division in turn makes a recommendation to the Administrator.

I think the important thing is this: That under the new procedures which have been agreed to by everybody in the airspace organization in the Air Coordinating Committee there is no question but what the Administrator has the final decision authority.

Mr. PLAPINGER. There was no question on that point at the time of our May hearings.

Mr. BOYLE. These are merely recommendations.

Mr. PYLE. There is no question at this time either.

Mr. BOYLE. He would decide.

Mr. PYLE. I think in equity one must do this; but the point, I believe, Mr. Plapinger is directing attention to is the fact—and it is a good one—that the responsibility is mine. I am the only person by law that is authorized to make this decision.

Now off the record.

(Discussion off the record.)

Mr. MEADER. I think the point also is it is diffusion of responsibility when you have a committee and members from the military and Post Office Department, and some other agencies of the Government, participating in a decision which is vested in the Administrator alone.

Mr. PYLE. Absolutely; you are absolutely correct.

Mr. BOYLE. If I could, Mr. Pyle—Mr. Meader, under this new procedure, the recommendations of all industry are included. The airline recommendation is in front of the Administrator, the recommendation of the aircraft owners and pilot association is in front of the Administrator.

Mr. PLAPINGER. What you are saying is this is a judicial decision; a quasi-judicial proceeding in which everybody sets forth his views?

Mr. BOYLE. That is right.

Mr. PLAPINGER. But here the airspace panel is presenting its views.

Mr. BOYLE. That is correct.

Mr. PLAPINGER. With the agency concerned apparently voting in that recommendation.

Mr. BOYLE. No. There is no longer any voting in the Air Space Division.

Mr. PLAPINGER. I assume this recommendation——

Mr. BOYLE. That was taken out.

Mr. PLAPINGER. Was reached through some procedure and if there were any dissents——

Mr. BOYLE. They are reported to the Administrator by the chairman of the airspace panel.

Mr. PLAPINGER. Did the agencies combined make recommendations to the Administrator, in addition?

Mr. BOYLE. They may, and so may the airline associations and transport associations.

As a matter of fact, the Administrator may, after receiving the views of the Airspace Division, decide that he wants to hold a public rulemaking proceeding, in which case he tells the Air Space Division, "I am going to hold one. I would like to have the views of the Airspace Division as to the form in which this public hearing is held."

(The matter referred to is as follows:)

JUNE 6, 1958.

INTERIM PROCEDURES FOR THE HANDLING OF RULEMAKING CASES IN THE AIRSPACE DIVISION AND REGIONAL SUBCOMMITTEE

In order to expedite the disposition of airspace cases pending in the Division and in the regional subcommittees, the following interim terms of reference shall apply to the Airspace Division and regional subcommittees until such time as permanent terms can be formulated and adopted:

GENERAL

The Administrator, or his representative, will be Chairman of the Airspace Division and regional subcommittees; provided, however, that the FCC will provide the Chairman of the Division when cases of primary interest to the FCC (such as antenna tower cases, farm areas, etc.) are under consideration.

PROCEDURES

I. In nonrulemaking cases

In the consideration and disposition of all matters not involving the Administrator's rulemaking functions as described in II below, currently existing procedures for the Airspace Panel will be followed by the Division and regional subcommittees [except for making the Panel a Division, chaired by the Department of Commerce, and retention of the ICAO Section under the Technical Division].

II. In rulemaking cases

The following procedures shall apply in the Division and regional subcommittees, as appropriate, to the consideration and disposition of all cases relating to establishment, modification, or recission of civil airways; and matters involving the designation, modification, or recission of control zones and areas, restricted areas, high density airports (or zones), flight-test areas, high-altitude routes, and those airport traffic patterns which are proposed to be adopted by the Administrator. Such procedures shall not, however, apply to matters involving farm areas or antenna sites whether within or without such zones or areas.

A. *Consultations.*—At the request of any member, an opportunity shall be afforded for consultations by Government agencies in both the Division and regional subcommittees.

B. *Procedures in regional airspace subcommittees.*—

(1) Proposals affecting the use or allocation of airspace may be filed by any person, and shall be filed with the secretary of the regional airspace subcommittee through the regional administrator of the CAA in whose region the matter arises.

(2) The secretary of the regional subcommittee will promptly advise persons appearing to have an interest in the proposal that it has been filed, and that the subcommittee will receive their comments and opinions with respect thereto, which will be considered at a meeting of the subcommittee to be called for this purpose. The regional subcommittees will continue to make every effort to resolve airspace matters.

(3) The chairman will not participate in the meeting itself, except as an impartial presiding officer. He will assure that proper consideration is given to all views and comments submitted, but will not act in the capacity of spokesman for any interested party.

NOTE.—The CAA will be represented by a spokesman to be designated by the regional administrator, through whom the views of the CAA will be presented on the same basis as are the views of any other Federal agency or interested party.

(4) Upon completion of consideration of the proposal by the regional subcommittee, the Secretary will prepare the minutes of proceedings and will forward such minutes to the Secretary of the Airspace Division. The minutes will contain a statement of the position of each interested party, together with the reasons for such position, and will be accompanied by such documentation as is available to support each stated position.

C. *Proceedings in the Airspace Division*—

(1) The Secretary of the Airspace Division will forward to all members and associate members, and other interested parties as appropriate, the minutes of the regional subcommittee. At the same time, the Secretary shall call a meeting of the Division to convene as promptly as is reasonably possible for the purpose of obtaining the views of the members and parties having a legitimate interest, and to reconcile any differences of opinion which may arise.

NOTE.—The CAA will be represented by a spokesman to be designated by the Administrator, through whom the views of the CAA will be presented on the same basis as are the views of any other Federal agency or interested party.

(2) Copies of the Airspace Division minutes on the proposal, together with the written comments and views received from members and associate members of the Division and other interested parties, shall promptly be furnished to the Administrator, members, and associate members, by the Secretary. Where the minutes of the Airspace Division indicate that the proposal has not been unanimously agreed upon, all supporting documents from the regional subcommittee shall also be forwarded to the Administrator by the Secretary.

(3) The Administrator, if he finds the proposal to be in the national interest, and if it is unanimously agreed upon by all interested parties, including the members and associate members of the Airspace Division, will take final action to give effect thereto.

(4) If the comments indicate that the members and associate members do not agree with respect to the proposal, the Administrator may elect to hold a public hearing, or secure from interested parties their further views in writing. If the Administrator elects to hold a public hearing, he will afford each member 7 working days' notice of his intention to publish notice of proposed rulemaking. In the event that information not previously available to the Airspace Division is presented to the Administrator in a public hearing or in written comments received by him, and provided such information affects more than one member of the Airspace Division, such information shall be furnished to the Division as soon as practicable.

NOTE.—The Administrator is required to exercise delegated responsibility for quasi-legislative rulemaking in accordance with the Administrative Procedure Act. He will also comply with these requirements in cases involving the designation, modification, or rescission of civil airways. The procedural steps may vary from full public hearings on controversial problems, to immediate publication of his decision as a rule in instances where proposals have been coordinated through the regional subcommittee and agreed to by members and associate members of the Airspace Division. Ordinarily, the Airspace Division has no further formal function to perform in an individual case once it has sent to the Administrator the comments of members and other interested parties, and the minutes and documentary material pertinent to the case. As the concluding step in the rulemaking process, the Administrator will publish his decision as a final rule, or will defer or withhold action as, in his opinion, is most consistent with the national interest. He may be expected to advise members and associate members of his decision simultaneously with the adoption of noncontroversial proposals, or prior to the adoption of proposals with which there has not been substantial agreement.

(5) In all cases where the Administrator exercises his rulemaking responsibility, original documentary material filed with the Airspace Division, together with minutes of meetings, shall be furnished to and retained by him so as to provide a legal basis for the action he decides to take.

Mr. PLAPINGER. May I ask just one further question on the CAA medical functions.

Recent issues of The Washington Stethoscope and the Washington Report, which are newsletters on health matters, make reference to the pending reorganization of CAA medical functions.

Can you tell us something about that?

Mr. PYLE. Well, Mr. Plapinger, working with the American Medical Association and being sure that we have the best medical setup that we can have, because of the obvious importance of the medical aspects of aviation, particularly with respect to certification of airmen, we are considering making some changes in our medical setup as a result, strengthening, reinforcing it, and making it more capable of doing the job.

Mr. PLAPINGER. Is there any disenchantment in the CAA over withdrawal of medical certification by the CAA and then being overruled by the CAB?

Mr. PYLE. I am not sure I get your question.

Can you hear?

Mr. PUTNAM. I do not think "disenchantment" is the right word. [Laughter.]

Mr. PLAPINGER. You use your word.

Mr. PUTNAM. We are disappointed, let's put it that way. [Laughter.] Because we feel that the Board hearing examiner has put an undue burden on the Administrator in proving the validity of his denial of certain types of airmen's medical certificates.

Mr. PLAPINGER. Is this provided for in the proposed Federal Aviation Agency Act?

Mr. PUTNAM. Yes.

Mr. BOYLE. It is specifically provided, Mr. Plapinger.

Mrs. GRIFFITHS. Do you have any questions?

Mr. MEADER. No.

Mrs. GRIFFITHS. Thank you very much. You have been very generous and very informative and very helpful. We appreciate it no end.

Mr. PYLE. Madam Chairman, I would like to express our appreciation for the chance to come up and tell our story.

I am very proud of what our agency is doing. I think I have a terrific team down there. I welcome this opportunity.

My only request is if there is any additional information that we can give you, if we can take you to Indianapolis or facilties down here, I consider this our obligation to you. We would be delighted to do it.

Mrs. GRIFFITHS. Thank you very much.

This committee is adjourned and will meet tomorrow morning, July 24, to hear the Honorable James R. Durfee, Chairman of the Civil Aeronautics Board and his associates.

(Whereupon, at 12:02 p. m., the subcommittee recessed, to reconvene at 10 a. m., Thursday, July 24, 1958.)

FEDERAL ROLE IN AVIATION

(1958)

THURSDAY, JULY 24, 1958

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON LEGAL AND MONETARY AFFAIRS
OF THE COMMITTEE ON GOVERNMENT OPERATIONS,
Washington, D. C.

The subcommittee met, pursuant to recess, at 10:15 a. m., in room 1501, New House Office Building, Representative John A. Blatnik presiding.

Present: Representatives John A. Blatnik, Martha W. Griffiths, and George Meader.

Also present: Jerome S. Plapinger, counsel, and Elizabeth D. Heater, clerk.

Mr. BLATNIK. The Legal and Monetary Affairs Subcommittee of the House Government Operations Committee will please come to order.

We proceed today in further hearing on problems of the Federal role in aviation.

This morning we are honored and privileged to have the Chairman of the Civil Aeronautics Board, the Honorable James R. Durfee.

Mr. Durfee, welcome. We appreciate you and your associates and staff assistants coming up to help us get a broader, more accurate, more comprehensive picture of the Federal role in aviation.

Mr. Durfee, you have a prepared statement?

STATEMENT OF HON. JAMES R. DURFEE, CHAIRMAN, CIVIL AERONAUTICS BOARD; ACCOMPANIED BY CHAN GURNEY, VICE CHAIRMAN; OSCAR BAKKE, DIRECTOR OF BUREAU OF SAFETY; FRANCIS STONE, GENERAL COUNSEL; AND ROSS I. NEWMANN, ASSISTANT GENERAL COUNSEL

Mr. DURFEE. Yes, sir, Mr. Chairman.

Mr. BLATNIK. Would you proceed and read the statement?

Mr. DURFEE. I can or I can highlight it. It is not very long.

I think in view of the fact it is an approved statement of the entire committee, I mean the entire Board has approved this statement, it is not my personal statement. It is a statement which has been approved by the entire Board.

I am accompanied this morning by Vice Chairman Gurney, who has served, I believe—this is your eighth year?

Mr. GURNEY. I am on the eighth now.

Mr. DURFEE. On the Civil Aeronautics Board.

Mr. Bakke of the Bureau of Safety of the Board; Mr. Stone and Mr. Newmann of the General Counsel's Office, Mr. Stone is General Counsel and Mr. Newmann Assistant General Counsel.

The Board is pleased to be here today to present its views on the Federal Government's role in certain aspects of aviation activities as set forth in Chairman Blatnik's letter of June 18, 1958.

The invitation extended to the Board listed various items pertaining to the Federal Government's role in aviation activities. In fact, I believe there were nine specific items referred to in this letter.

Inasmuch as several of these items are matters falling within the jurisdiction of other agencies, the Board's testimony will be confined to the extent and effectiveness of the safety rules and other safety measures designed to prevent air crashes and the status of the Board's activity in the regulatory field with respect to the imminent introduction of nonmilitary jet aircraft. However, we wish to make it clear that the Board is very much interested in the other areas of your investigation, particularly as it applies to the airways modernization plan, air navigation equipment, airport separation, the national airport plan, and the operations of the Airways Modernization Board.

The Board consults fully with the agencies concerned with these activities in order to insure that regulations are kept abreast of the "state of advancement of the aviation art."

I am sure you are aware of the Board's support of the proposed legislation for the extension of the Federal Airport Act. Adequate and improved airports are essential for jet operation and the safe and expeditious movement of all aircraft in the air traffic control system.

The Board has worked closely with other agencies on airport problems regarding site selection, runway layout, airport utilization, and airport operations problems.

The Board offered numerous suggestions for modification of the proposed Airways Modernization Act of 1957 which were accepted by the Congress. These revisions clarified the military and civil research and development responsibilities and the CAB–AMB relationships regarding the air navigation and traffic control system. Since the Airways Modernization Board was created the Civil Aeronautics Board has established direct liaison with that organization and has invited its personnel to participate in domestic and international meetings to consider problems of mutual interest. Both the Board and the Airways Modernization Board have held top-level briefings to familiarize personnel with the problems and work programs of the respective agencies.

With respect to the Board's activities in the area of rulemaking, you are undoubtedly aware of the recent report on air safety which the Board submitted to Congress. This report, entitled "The Advance in Air Safety," was designed to acquaint the Congress with aviation's primary safety problems. It outlined the growth of traffic, the near-miss problem, the collision problem, and the Board's regulatory program as related to the aviation picture today. The report summarizes the safety progress which has been made as well as the comparative growth of aviation and air travel over the years.

Mr. Chairman, at this point I would like to submit for the record a copy of the Board's report. I believe that that has been furnished for the record—"The Advance in Air Safety."

Mr. BLATNIK. The report shall be included with the files.

Mr. DURFEE. I offer that.

We are certain the committee appreciates that the formulation of basic regulatory policy involves delicate balancing of rights and interests of the various individuals and organizations within the industry as well as the keen sense of timing insofar as air traffic control and navigation system capabilities, aircraft development, and aircraft operations are concerned.

The Congress vested in the Board the authority and responsibility to regulate safety in air commerce. The Congress also charged the Board with still another duty—that of promoting and encouraging the development of civil aeronautics. Thus, while safety is clearly a principal goal in the exercise of regulatory power by the Board, it is not an exclusive or absolute objective but must be considered in the light of the overall public interest.

The Board's entire regulatory program has been developed regulation by regulation, section by section, keeping these general principles in mind. Your committee is concerned particularly with safety measures designed to prevent air crashes. We will review briefly the existing problems and then the recent actions that have been taken to alleviate the situation.

The air traffic problem—the Board has never considered the grounding of practically all air traffic as the solution of the air traffic problem. Obviously collisions can be completely eliminated through the strictest kind of rationing of the use of the airspace, perhaps permitting the use of 15 percent of today's desired flight operations. Nobody, however, has suggested that this easy solution to the problem is even remotely in the public interest.

However, rules which would require that all aircraft be subject to positive control, eliminating the so-called see and be seen concept of operations in use today, would have precisely such an effect.

Regardless of the form a regulatory restriction takes, a price must be paid; and invariably the price must be the grounding of aircraft, imposing an economic penalty, denying the use of airports, airspace, and so forth, to some segment of aviation. Such action under some conditions is necessary, of course, but the determination or extent to which this has become and is becoming necessary requires judicious consideration of the rights and safety of all concerned.

Other modes of transportation are concerned with similar problems. For example, highways today are overcrowded. Every day we are experiencing tragic automobile accidents. New superhighways are being built but we do not close or prevent the use of roads until these objectives are accomplished.

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Today aviation is confronted with the same problem in the movement of aircraft along the aerial highways and in the off-airway areas in the airspace of the United States and throughout many areas of the world.

The Administrator of Civil Aeronautics has stated that we are currently experiencing as many as 200,000 daily flight operations within the United States. Just 2 years ago, at approximately the time of the Grand Canyon accident, he estimates that the air traffic control system had a capacity to handle approximately 11,000 flights daily. This is slightly more than 5 percent of our national total. He also testified that in the past 2 years this capacity has been increased to approximately 17,000 flights daily While this represents a commendable improvement in the total capacity of our system, it is still pitifully small in relation to our total aeronautical activity. The reason is apparent.

According to the Statistical Handbook of Civil Aviation, published by the Civil Aeronautics Administration—I am referring to page 2 of that document—the CAA program for the establishment of air navigation facilities in 1955 was slightly over $3 million; in 1956, this program was increased to $23 million. Out of the public awareness which the Grand Canyon tragedy aroused, there followed a great impetus to the air navigation facilities program. In 1957, the program for the establishment of air navigation facilities was again increased, this time to $75 million; still further increases were effected in 1958, when the program exceeded $146 million. The total facilities establishment program authorized for 1959 is now $175 million.

The greatly expanded facilities program during the past 2 years has made possible the increased capacity of our air traffic control system, which in turn has enabled the inauguration of positive control this year on a limited basis.

The Board regulates air traffic through the issuance of Civil Air Regulations, Part 60, Air Traffic Rules, and other special civil air regulations pertaining to air traffic problems.

At this point, Mr. Chairman, I should like the record to show the specific regulatory provisions recently adopted by this Board and actions contemplated for the immediate future:

1. In February 1957, the Board authorized the Administrator to designate high density air traffic zones in which certain speed control and communication rules apply.

I believe the first one of those zones which was designated was the Washington area.

Mrs. GRIFFITHS. May I ask what the speed limit was?

Mr. DURFEE. The speed limit, I think, was 169.

Mr. NEWMANN. 169.

Speed limit in high density zone is 180 miles per hour (maximum) or 160 knots—or lowest safe operational speed of aircraft if above this limit.

Mrs. GRIFFITHS. Thank you.

Mr. DURFEE. Designation of such zones is now underway by the Administrator.

2. In February 1957, the Board adopted certain air-traffic rules compelling flight-test operations to be conducted within areas specifically set aside for such purposes. The designation of such flight-test areas has become a continuous duty of the Administrator.

3. In October 1957, the Board amended the air-traffic rules to establish a continental control area in the entire United States airspace above 24,000 feet. This action enlarged considerably the total extent of controlled airspace and also limited visual-flight-rules operations above 24,000 feet to weather conditions in which the visibility is at least 5 miles and in which a distance from clouds of at least 1,000 feet vertically and 1 mile horizontally can be maintained. It is anticipated that the continental control area will soon be lowered at least to 15,000 feet and that, ultimately, a system of positive control would be provided by the Administrator throughout this airspace.

4. In January 1958, the Board amended part 40 of the Civil Air Regulations to prohibit off-airways instrument-flight-rules operations at high altitudes in air-carrier service.

5. In order to insure that the Administrator is fully armed with authority to take decisive action with respect to the designation of restricted areas, the Board amended part 60 of the Civil Air Regulations in February 1958. This amendment clarifies the power of the Administrator to establish, amend, or revoke special airspace restrictions in the interest of protecting safety in air commerce. It also limits the basis upon which military deviation from part 60 might be authorized.

6. Although it is anticipated ultimately to provide a system of positive control throughout the continental control area, the air-traffic-control system does not possess the required capacity at this time. The Board, on May 28, 1958, adopted a special regulation authorizing the Administrator to designate transcontinental positive control routes within which no aircraft operation would be permitted except under air traffic control.

7. On June 6, 1958, the Board adopted an amendment to part 60 of the Civil Air Regulations establishing a hemispheric cruising altitude requirement which will simplify substantially the cruising altitude rules. This requirement will also provide vertical separation between instrument flight rules and visual flight rules aircraft cruising flight altitudes.

8. A study has been underway for several months in collaboration with the Naval Research Laboratory and the Air Force Training Command to evaluate the effects of certain highly luminescent paints for the purpose of increasing aircraft conspicuity. It is expected that a notice of proposed rulemaking will be issued by the Board within the next several weeks.

9. On June 5, 1958, the Board issued a notice of proposed rulemaking which would require the use of standard pressure settings at the higher altitudes to give greater assurance of air-traffic separation.

Other rules presently under consideration, which show promise of materially reducing the chances of midair collision, include:

1. The increased conspicuity of aircraft by the use of high-intensity lights.

2. The extension of speed control to require all aircraft operating in excess of certain speeds to be flown in positive-control airspace.

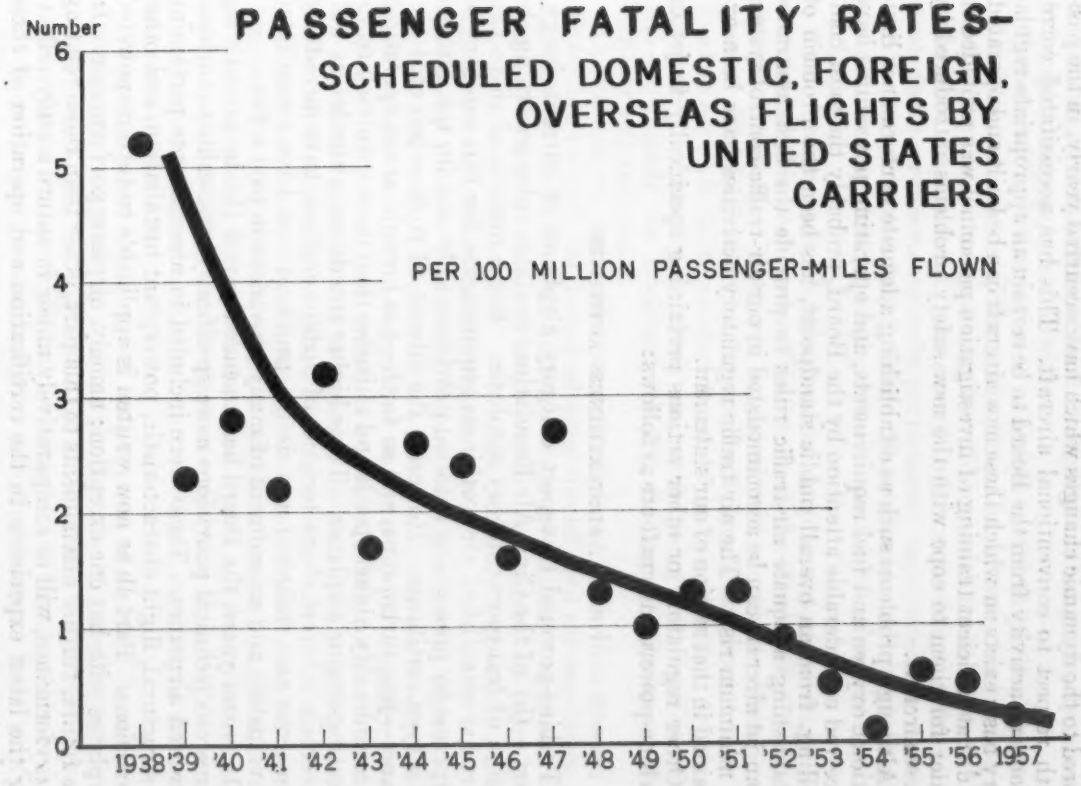
3. The Board is continuing to study the relationship between aircraft speed and minimum visibility with a view to formulating appropriate rulemaking.

4. Anticollision devices. The Board has encouraged the development of operational requirements for anticollision devices, such as the proximity warning indicator. The industry's developments in this area have been followed with great interest, and the Board is hopeful that the efforts now being directed by the industry and the Airways Modernization Board will produce a device which can be successfully used to further alleviate the collision hazard. The state of development has not reached a point where regulatory action can or should be considered at this time.

5. An inordinate number of accidents has resulted from the operation of aircraft in poor weather conditions by pilots lacking training and experience to properly maintain the altitude of the aircraft in such poor weather conditions. In addition, these unskilled pilots have sought air-traffic-control assistance, resulting in interruptions to traffic which create potential traffic hazards. A draft release has been circulated to the aviation industry proposing additional knowledge, experience, and skill requirements for applicants for private and commercial pilot certificates.

6. The Board is now considering whether the advent of civil air carrier jets will require a regulation making mandatory the use of positive-control airspace.

Your letter of June 18, 1958, indicates the committee is concerned with the effectiveness of these and the Board's previous regulatory actions. For your information, we present for the record the attached chart showing the comparative accident statistics from 1938 through 1957.


PASSENGER FATALITY RATES–
SCHEDULED DOMESTIC, FOREIGN, OVERSEAS FLIGHTS BY UNITED STATES CARRIERS
PER 100 MILLION PASSENGER-MILES FLOWN
Number
6
5
4
3
2
1
0
1938 '39 '40 '41 '42 '43 '44 '45 '46 '47 '48 '49 '50 '51 '52 '53 '54 '55 '56 1957

I believe the chart is available.

The committee also desired a report on the status of the Board's activity in the regulatory field with respect to the introduction of civil jet aircraft.

Developments in the design, construction, and operation of turbine-powered aircraft have been characterized as explosive, even when compared to the dynamic changes which have occurred yearly, in the past, with respect to conventional aircraft. This has necessitated corresponding activity from the Board to be certain an appropriate regulatory basis exists on which these new aircraft can be built and operated, and that sufficient training of investigation personnel was provided in order for them to cope with the new safety problems introduced by these aircraft.

Although problems such as establishing adequate performance limitations, oxygen and fuel requirements, and operating procedures have received considerable attention by the Board, probably the most compelling, from an overall public standpoint, has been the problem of establishing adequate air-traffic rules to provide the best assurance than jet aircraft can be accommodated in our air-traffic-control system at minimum risk. The air traffic regulatory activities have been explained in that section of our statement.

Other regulatory or other actions pertaining specifically to jet or turbine-powered aircraft are as follows:

A. AIRWORTHINESS ACTIVITIES

Turbine-powered transport category airplanes of current design: Part 4 (b) of the Civil Air Regulations contains rules governing the design of transport category airplanes. For a number of years, this part has established airworthiness requirements for this category of airplanes by prescribing detailed provisions to be met for the issuance of a type certificate. However, the advent of turbine-powered airplanes—jets, turboprops, and so forth—has brought about operations at considerably higher speeds and altitudes than those involving reciprocating-engine airplanes. These higher speeds and altitudes, as well as certain inherent characteristics of turbine engines, have introduced numerous new technical and design problems and have necessitated reevaluation and amendment of many provisions in part 4 (b).

In recent years, the Board has amended part 4 (b) by introducing numerous technical provisions more specifically applicable to turbine-powered airplanes. These were included in amendments pertaining to structural, flight characteristic, powerplant installation, and other provisions. Part 4b as now written is applicable to turbine-powered airplanes with but one exception; namely, airplane performance. In the future, further amendments to this part, other than those relating to performance, will be comparatively minor in nature mainly reflecting the latest experience in the certification and operation of these airplanes.

Recognizing the need to cope with the problems raised by the introduction of civil jet aircraft, the Board, after careful study, adopted special civil air regulation No. SR–422, on July 23, 1957, which became effective August 27, 1957. This regulation prescribes airworthiness and performance operating limitations for application to

all turbine-powered airplanes for which a type certificate was issued after August 27, 1957.

The provisions in SR–422 make applicable new performance requirements and many new design requirements discussed previously which were developed primarily for application to turbine airplanes. The standards are intended to insure that the level of performance of turbine transports will be at least equivalent to that generally attained by reciprocating-powered airplanes.

Because of limited experience in design, certification, and operation of turbine-powered airplanes, the Board is actively continuing the study of appropriate regulations to introduce such revisions as further experience may warrant. As a result of these studies, the Board has made further refinements to the performance requirements as reflected in SR–422A, adopted July 2, 1958. These changes will result in additional insurance that jet airplanes will have a level of safety expected by the public.

Two foreign-built turbine-powered airplanes have already been certificated this year under SR–422; i. e., the Fokker F–27 and the Bristol Britannia. Both are equipped with turbopropeller powerplants. The Fairchild Co. has made a licensing agreement with the Fokker Aircraft Co. to produce the F–27 in this country. Other turbine-powered airplanes which are undergoing certification under SR–422 include the Lockheed Electra, Boeing 707, Douglas DC–8, Convair 880, and others.

Conversion of currently operated airplanes to turbine power: On November 15, 1957, the Board adopted special civil air regulation No. SR–423 to facilitate the modernization of existing reciprocating-engine-powered airplanes through conversion to turbine power. Such conversions are anticipated to increase economy and safety of continued operation of existing equipment.

Standby power: The Board is considering a special regulation to provide authority for and establish conditions relative to approval of performance credit for airplanes equipped with standby power. Standby power is short duration power—JATO rockets—intended for use in emergencies and is expected to increase the utility as well as the safety of currently operated airplanes.

Flight recorders: On August 5, 1957, the Board adopted amendments to the operation rules which require after July 15, 1958, the use of flight recorders which record time, airspeed, altitude, vertical acceleration, and heading on all airplanes of more than 12,500 pounds maximum certificated takeoff weight, which are certificated for operations above 25,000 feet.

These recorders are required for purposes of accident investigation and for use in analyzing various incidents, such as extreme vertical accelerations due to turbulence or unusual maneuvers which occur from time to time in flight but do not result in accidents, in order to take appropriate precautionary or remedial action. Such airplanes will be operating under conditions with respect to which little operational experience directly applicable to civil transportation exists, and the recorded intelligence involving these higher altitudes, pressure differentials, and speeds will help materially in making a more accurate determination of the cause of accidents.

Additional airworthiness studies: The Board has underway certain additional studies in the airworthiness field concerning altimetry, powerplant, crash fire prevention, means of minimizing the probability of occurrence of propeller overspeeding, and inability to feather the propeller in such cases.

Jet operations—Air carrier oprations rules: During the past fiscal year, the air carrier operating rules have been under continuous review. Jet operations will be monitored very closely and refinements to the air carrier regulations will be made, as necessary, to insure the highest degree of safety. In this area, such matters as fuel reserves, oxygen supply, high-altitude navigation, and traffic-control problems will be significant. The Board has found for the most part the existing rules provide a sound regulatory basis for the imminent operation of jet transports by air carriers.

In order to insure that the air carriers conduct crew training and obtain as much experience as possible in ground handling, maintenance, and flight of the new jet transports prior to their introduction into commercial service, the Board adopted a special civil air regulation No. SR–425 on June 20, 1958. This regulation provides for provisional certification and operation of these transport airplanes, prior to full completion of the normal certification process. Considerable technical and operational information, of great value to the Government and industry, will flow from operations conducted in these provisionally certificated transports.

Investigation of jet aircraft accidents: The Board has worked out an agreement with the Air Force whereby the Air Force permits accident investigators of the Board to participate in Air Force investigations of jet crashes where the Board believes information may be pertinent to regulations or future board investigations. This arrangement is working satisfactorily and the Board has received a great deal of worthwhile information and experience from its participation in this activity.

Mr. Chairman and members of the committee, this concludes my statement. We are available for questions.

Mr. BLATNIK. Mr. Durfee, just before you completed your statement, on page 15 you state that you have "provisional certification and operation of these transport airplanes."

That has been going on now for how many months?

Mr. DURFEE. I believe Mr. Bakke could answer. It is just recent, I believe, Mr. Chairman. I believe Mr. Bakke can give you the exact time.

Mr. BAKKE. Sir; provisional certification has not actually been accomplished in any aircraft as yet.

SR–425 was adopted as a regulation on the 20th of June 1958. The first airplane which is contemplated will be certificated under this special regulation is the Boeing 707.

Just during the past week, we have had meetings with the Boeing folk, exchanged correspondence, with respect to certain provisions of the special regulation. We expect this first aircraft will be certificated under this rule within the next 2 weeks.

Mr. BLATNIK. And when it is certificated, it will be fully operationally——

Mr. BAKKE. No, sir; provisional.

Mr. BLATNIK. Provisional. I see.

Mr. BAKKE. Yes, sir. The provisional certification is perspective in character. It take an airplane which has come off the production line for which the type certifications are still in process, and it says, "We will permit the operation of these aircraft provisionally for the purpose of indoctrinating air-carrier crews, carrying on certain training activities, and so on." It is a process through which we will make maximum use of available airplanes prior to the completion of certification in order that on the certification date, we will have as great an operational experience in the airplane which is being tested as practicable.

Mr. DURFEE. Mr. Chairman, I believe on that point that Pan-American, which is getting the first Boeing 707's and will introduce them in their transatlantic operation, following this provisional certification, in order to facilitate the use of the aircraft and to minimize the economic aspects, I believe the Board has also authorized Pan-American to carry air cargo and mail with these provisional certificated aircraft—no passengers.

On the transatlantic run, they can carry cargo and mail during this period of provisional certification.

Mr. BLATNIK. It appears to me to be a tremendous job to fully check and doublecheck every aspect of the operation and performance, control, maintenance, and all that is required in an entirely new piece of airborne mechanism.

Does that mean constant study and operation of your CAB inspectors? Just how is that?

Mr. DURFEE. Mr. Bakke.

I could answer the question "yes," but I think Mr. Bakke could probably answer it more accurately than that.

Mr. BAKKE. Sir, I should first point out that the Board, in exercising its legislative function, lays down the standards which shall apply in the certification process. The Board does not itself administer these regulations. Having established the certification standards, it then gives these standards to the Administrator, who examines a particular product and makes the determination as to whether the objectives of the regulations have been met.

So far as the amount of time which is required in the checking of the engineering of a new aircraft for the purpose of certification, I have some figures which I think might be of interest to the committee. I do not have absolute figures, total engineering man-hours, but I think these are suggestive of the amount of attention which is required.

If we were to consider the engineering man-hours required for the certification of the DC–3 as one, the DC–4 requires 7.7 and the DC–8 requires 31. So the amount of engineering man-hours required for the certification of the DC–8 is on the order of 31 times that of the DC–3.

The overall hours for the manufacturer to develop a type is on the order of 21 to 1.

The answer to your question is "yes," there is a great deal of attention, a great deal of effort required to supervise the certification process.

Mr. BLATNIK. I notice large ads in newspapers and magazines now announcing the forthcoming jets for civilian transportation in the "very near future."

Is that pretty well established, that they will be fully certified for operation say within 4 or 5 months from now? Say by December?

Mr. BAKKE. Sir, the most recent perspective date for the certification of 707 is in the middle of August.

We are anticipating that scheduled operations in this airplane should begin within 60 days thereafter. Before the end of this year, I think it very probable that we shall see scheduled operations in the first jet aircraft Boeing 707.

Mr. BLATNIK. Would it be possible to handle these fast-moving craft?

I can see on a cross-country run their altitude would be so much higher that would be no problem, but would not their approach be considerably different near an air terminal where you have predominantly reciprocating-engine craft? Do they not require a larger sweep to enter traffic—an entirely different traffic pattern I would say?

Mr. BAKKE. Sir, as far as the safety problem is concerned, we would say quite the converse is true; because of its high-flying characteristics, when it is enroute, operation will probably be the troublesome area.

The fact is the airplane has been so efficiently designed for operation at low altitudes in the vicinity of airports, we expect no difficulty. We believe that this airplane will be able to joint traffic patterns with reciprocating aircraft without any difficulty.

Approaches will be very much like conventional approaches in the reciprocating-engine aircraft. Speeds will not be of considerably higher order.

Enroute, however, we have an entirely different case. We will come close to doubling the speeds of the aircraft. Not only that but the aircraft will be operating in an environment within which like aircraft of extremely high speeds will be operating. Here we are talking about closure rate or possible closure rates of aircraft doing in excess of 1,000 miles an hour.

Whatever might be the difference of views of experts as to where we begin to cross the line as to what is acceptable and what is no longer tolerable in closure rates, no one disputes the fact that once we get into the neighborhood of 1,000 to 1,200 miles per hour closing rates that here we have exceeded the human capabilities to see and avoid. It is with this question that the board is now dealing.

Having inaugurated the positive control route operation in a special regulation in June this year, the board is now considering whether the use of positive control airspace should be made mandatory in all scheduled jet operations.

This is a very, very serious consideration; serious not only because of its safety implications, but because of the implications that a limited caacity of our air traffic control system might very well prove to be very limiting with respect to the effective and economic use of the aircraft within the next year.

Mr. BLATNIK. Are you going to do a reevaluation of any research investigation by other countries?

I am thinking particularly of the British Jet Comet which, having successfully passed all required tests, began to make its Rome run to Egypt, then suddenly had a series of explosions.

Do you have access to the previous experience of operations by other countries, such as the Comet in England?

Mr. BAKKE. Very much so, sir.

There are at least two sources of information. For instance, the experience of the British, which we have tapped very extensively. In the first place, we have excellent relations with the British. During the past year, we have sent representatives to England on four separate occasions to discuss their regulatory and engineering experience in the design of very recent aircraft. They have sent three delegations to the United States to exchange views with us concerning some of the problems that they have encountered.

We have sent investigators to participate in the investigation of accidents involving aircraft of a type similar to that sold by British producers in the United States. They have also sent their experts here to assist us in the investigation of accidents involving their aircraft.

Right now, for instance, we have a gentleman from the Royal Aircraft Establishment, which is the equivalent of our NACA, who is at this very moment working with some of our engineers in a warehouse here in Washington examining some parts of a turbine-engine aircraft which are under study.

It is true of the International Civil Aviation; Mr. Keneesi, Chief of our Airworthiness Committee, is in Montreal sitting in on a Standing Airworthiness Committee to discuss certain international problems relating to the certification and operation of turbine-engine aircraft. And all of the folk who are represented on this committee have brought of their knowledge and technology to Montreal. When he returns, I am positive, as he has on many other occasions, he will bring with him much of the experience of other folk, such as the British.

From this experience, I think there are two rather interesting illustrations that I might give of the manner in which we have benefited from the experience.

First of all, with respect to the in-flight explosions of the Comet, as a result of their investigation it has become very clear that this was due to the design of the fuselage of the aircraft, one which, very much like a paper bag or a balloon, once a flaw or fault occurs in the metal envelope, the progression of the fault is so rapid that it results in much like the explosion of a balloon or explosion of a paper bag upon impact.

Well, this led to a great deal of attention, both in the regulations and obviously in research activities among the manufacturers of the United States. It led to the development of what we call in our regulations the "Fail safe design concept." We have a regulation which is a rather simple one. The technology which was involved to permit us to write the regulation, however, is a rather complex one.

The regulation merely states that the fuselage of an aircraft, in fact all parts of the structure of the aircraft, will be so designed that a failure of any one component shall not progress beyond the limits of that one particular component.

So, for instance, if we have a sheet of aluminum, if that sheet of aluminum fails, it shall be impossible for that failure to progress beyond that particular sheet of aluminum.

Mr. BLATNIK. In other words, you compartmentalize it?

Mr. BAKKE. Exactly, sir.

We also require that every load required on a particular structure member shall be capable of being passed on to another structural member in the event of failure of the first one.

Some very interesting films—one Boeing particularly has which I am sure will fascinate this committee, called Operation Guillotine, where they actually exploded certain sections of the aircraft fuselage. In the earlier designs, it was indeed an explosion. As the design of the fuselage was changed, as it became closer to meeting the objection of part 4 (b) of our Civil Air Regulations, it is now apparent penetration can be made into the fuselage, pressure can be dissipated as a result of the flaw, but no explosion will occur, no catastrophic failure of the structure will occur.

The second area, the committee may recall an accident which occurred to the *Comet* at Rome where the pilot, at an airspeed somewhat less than what is known as the breaking-ground speed, pulled the nose of the airplane up into a somewhat excessive attitude. The excessive attitude, however, was only approximately 2° greater nose up than the attitude required for normal takeoff. However, in this attitude, the drag of the airplane was so great it was unable to leave the ground. There was an accident; the airplane went off the runway and it was destroyed by fire.

This led to a great deal of attention being focused on the characteristics of the jet aircraft. It was apparent where propellers are absent, in the case of the jet, during takeoff the plane no longer has the advantage of the propeller blast over the wing surfaces, which produces a great deal of lift. Absent this condition, the jet is much more dependent upon the relative airflow as it passes through the air, and conditions such as this can develop far more critically than had been our experience in the past.

Mrs. GRIFFITHS. Mr. Chairman, may I ask a question?

Mr. BLATNIK. Mrs. Griffiths.

Mrs. GRIFFITHS. Do the British have the same regulations that you have?

Mr. BAKKE. No, ma'am, they do not.

Mrs. GRIFFITHS. Then when a plane is bought by an American company from a British manufacturer, do you require it, before it can be flown by an American company in this country, to meet your regulations?

Mr. BAKKE. The answer to that is "Yes," but there is a very substantial qualification which must follow. If I may be permitted first to qualify my previous answer, the regulations which are employed by the United Kingdom are not the same as ours. However, as a result of the considerable exchange of information which has occurred, especially through the ICAO—International Civil Aviation Organization—our certification requirements in the last 10 years have come much closer together. As of today, they are probably closer than they ever have been before, and I think this will continue as the extent of our collaboration with other states, including the United Kingdom, continues.

Up until about 2 years ago, about 3 years ago, it was necessary for a foreign manufacturer of aircraft to meet all of the certification requirements of our part 4 (b) of the Civil Air Regulations, and the Administrator must certify that such a product does in fact meet them. However, approximately 3 years ago the Board adopted a new

part 10 of the Civil Air Regulations for the certification of foreign aircraft.

This part requires that the level of airworthiness required in part 4 (b) be certified by the Administrator, but it gives the Administrator considerable flexibility in determining whether the airworthiness requirements or airworthiness level contemplated by 4 (b) is met.

It gives the Administrator, for instance, the capacity to determine when a technique other than that expressly required by part 4 (b) provides the same level of airworthiness, whether a different device will do substantially as we require.

Mrs. GRIFFITHS. Did a particular company ask you for that regulation?

Mr. BAKKE. I do not recall how part 10 was originated, ma'am. I believe that it probably arose from the operation of, you might say, many measures, many forces. I just do not recall who——

Mrs. GRIFFITHS. Could you make that available to this committee, how you came to change the regulation?

(The following information was furnished:)

Prior to the promulgation of part 10 of the Civil Air Regulations, approval of import aircraft was subject to bilateral agreements with foreign countries which provided for the reciprocal recognition of United States certificates of airworthiness for such aircraft. The certification of aircraft under the bilateral agreement arrangement caused considerable administrative difficulties since the agreements provide only for the issuance of airworthiness certificates, whereas the Civil Aeronautics Act specifically requires a type certificate as a prerequisite for the issuance of an airworthiness certificate for aircraft. Further, a need existed for provisions for the issuance of approval of all foreign-manufactured materials, parts, and appliances. This matter was highlighted during the certification of the Vickers Viscount airplane which Capital Airlines intended to use. The decision to promulgate part 10 of the Civil Air Regulations was reached as a result of discussions between the Civil Aeronautics Board and the Civil Aeronautics Administration. No specific request for issuance of this regulation was received from any outside source.

Mr. BAKKE. Yes, we certainly can; be delighted.

Mrs. GRIFFITHS. Because in reality an American passenger on a plane bought out of this country is not really flying in a plane that you consider to have all the necessary safeguards.

Mr. BAKKE. No, ma'am, I would not agree with that.

Mrs. GRIFFITHS. You feel that the Administrator is giving you all the safeguards in a foreign-purchased product?

Mr. BAKKE. I suppose I should qualify it this way, were it possible for us to guarantee that the Administrator in every respect satisfies the objectives of the regulation, then obviously I would say even though different techniques are used in achieving this, the level of airworthiness is the same.

Mrs. GRIFFITHS. Thank you.

Mr. BAKKE. I would not say, however, that the Administrator is faultless in this respect with the hundreds of considerations that go into the certification process, there might very well be on occasions certain particulars with which we would differ with the Administrator. This, however, I would not consider unusual.

Mrs. GRIFFITHS. Thank you, Mr. Chairman.

Thank you.

Mr. PLAPINGER. May I ask a question in that respect.

Do you review the decisions of the Administrator, Mr. Blakke?

Mr. BAKKE. Not in detail.

Mr. PLAPINGER. Have you ever found any instances in which you did disagree?

Mr. BAKKE. Yes, we have.

Mr. PLAPINGER. What is the disposition of those?

Mr. BAKKE. We immediately get together with the Administrator to determine the basis on which the approval was rendered. Unfortunately it escapes me now as to what the particular case was. I believe it had to do with the emergency exit design of a particular aircraft type. The matter has not been disposed of as of this date.

Mr. PLAPINGER. When did this contention arise?

Mr. BAKKE. I think it has been several months now. I am sure 9 months. The airplane is in active operation. It is a very successful airplane. I would not say that our interest is purely academic—it obviously goes beyond that—but we do not consider it so serious, for instance, as to jeopardize the certification status of the airplane. But we are continuing our exploration with the Administrator.

Mr. DURFEE. Mr. Chairman, by way of illustration, I might point out I think Northeast Airlines actually contracted to purchase a number of Britannias, British manufacture turboprop airplane. I think that certification of that aircraft was held up for almost a year before it conformed to the standards which the Board and the Administrator required; is that right?

Mr. BAKKE. Yes, sir.

As an illustration there, the British finally came to us and asked for a waiver of our regulations.

Mr. DURFEE. It is quite an impact on the carrier, too.

Mr. BAKKE. In order to permit the carrier to design the strength of a single main strut to something less than the maximum torque—that is the turning which would be experienced were a pilot to lock a left brake, for instance, and turn the airplane about the landing gear truck. This would produce, of course, a great deal of strain.

The British argued you do not have to design 100 percent of torque because "Our pilots are instructed never to lock the brake. They must always roll forward. So the torque would be less than 100 percent." We refused to grant the waiver because there was no way they could guarantee no pilot would ever lock his brake in some place, in a terminal that was crowded, for instance, and produce this torque. We refused to waive our regulation.

The Britannia complied with this regulation and unfortunately—or fortunately, as the case may be—the carrier, before taking delivery of the airplane, actually terminated the contract and never took delivery.

Mrs. GRIFFITHS. I think it puts you in a real tough position because business is always increasing. We do not have enough airplanes and these people must put lots of pressure on you to permit them to buy planes. But I hope you continue to protect the rest of us who are flying in them.

Mr. MEADER. Mr. Chairman.

Mr. BLATNIK. Mr. Meader.

Mr. MEADER. Mr. Durfee, as you perhaps know, I have a special interest in the separation of major airports in a terminal complex.

I notice in the booklet you gave us, entitled "The Advance of Air Safety," on page 17 you refer to a 46-page report on midair collisions.

Mr. DURFEE. Yes, sir.

Mr. MEADER. I would like to ask the counsel if we have that report.

In any event, I would like to have a copy for myself if I may, Mr. Durfee.

Mr. DURFEE. We can furnish it for the record.

Mr. MEADER. If the committee does not have that report, I think we should have it. (See appendix, exhibit 1, p. 409.)

Mr. DURFEE. Yes, sir.

Mr. BAKKE. Yes, sir.

Mr. MEADER. Now, the last two paragraphs on page 17 read as follows:

Clear weather prevailed in 94 percent. Visibility was more than 3 miles in 98 percent.

This is speaking about midair collisions.

Ninety-four percent happened in daylight. All but 14 percent were on or within 5 miles of an airport.

In descending order of frequency, the operations at the time of these collisions were landing approach, traffic pattern, normal flights, and takeoff climb. There were a few in buzzing, acrobatics, and racing. All but 7 percent occurred below 3,000 feet.

Now I want to refer back to the testimony as I understood Mr. Bakke gave a few moments ago about the commercial jets and the possible traffic patterns, holding and approach patterns. I believe I recall his stating that it was anticipated that at least the 707 would be accommodated with propeller aircraft and not require any different holding and approach patterns for the jet airliner.

In that connection, I would like to refer first of all to the Airport Design Manual the Civil Aeronautics Administration puts out.

I understand there has been no recent one. This was issued in January of 1949.

I want to read an excerpt from page 11 of that manual, which is as follows:

The minimum distance between airports for contact operation should be equal to the sum of the radii of their traffic patterns. The radii of the airport traffic patterns is as follows: Personal and secondary, 1 mile; feeder, 2 miles; trunkline and express, 3 miles; continental and larger, 4 miles.

Greater separation probably will be required if instrument operations are to be conducted. A study should be made of the existing or potential instrument traffic patterns for airports in the area and adequate separation between the airports should be provided to avoid conflicts in instrument approach patterns.

Now, in our hearings 2 years ago, we asked Mr. Lowen if any study had been made of holding and approach patterns to be expected when jet commercial airliners come into use, and he testified that they were then going to make a study he expected to be completed in 6 months that would answer some of the questions about separation of major airports in a terminal complex.

Recently in these series of hearings we did have some testimony on that point and studies are underway at the Indianapolis Laboratories for the Civil Aeronautics Administration on this question. But I wanted to call your attention to the testimony of Mr. Thomas with respect to the traffic patterns of jets.

I raised the same question about separation between airports in a terminal complex and Mr. Thomas said—I am reading from page 345 of our hearing of July 22, 1958:

Insofar as the faster aircraft needing more distance between them, this is true. The turning radius of aircraft is a function of its speed. For a 3° turn—

that is, 3° per second turn—which is the conventional turn with piston-driven aircraft, the turning diameter of the circle is about 39 seconds of level flight. So for 180 knots, which would be what we are normally accustomed to, we would have a diameter of about 2 miles.

Now, the jet aircraft at the higher altitudes turn at 1½° instead of 3°, so we use about 79 seconds of flight; and our speed is faster so therefore we get into tremendous areas for holding. But this is not done over the airport; it is done some ways out from the airport where the aircraft are held at high levels and then are brought into a secondary fix, and then radar vectored on in where they may or may not turn at 3°, and it depends on the true airspeed.

Now, I want to quote one other thing first. In Mr. Pyle's statement to the committee, in his prepared statement on page 18 is this sentence, under the heading of "Airport Separation":

As the traffic pattern is extended for the larger and faster aircraft, it is necessary that more distance be provided between airports located in a terminal complex.

Now, first of all, I would like to ask, because it is not quite clear from your statement and I do not have other information, does the Civil Aeronautics Board in its legislative power have any authority whatever with respect to airports?

Mr. DURFEE. Mr. Bakke.

Mr. BAKKE. Sir, there is a provision in title VI of the act which governs the licensing, the classification of facilities. There has been question raised from time to time whether the Board's normal role in the prescription of standards for airport design was contemplated by the Congress in this provision of title VI. There is, however, a more important factor which has prevented the Board from actually utilizing any authority which may exist in title VI, and that is a two-fold consideration.

First of all, even if the Board could regulate with respect to airports—by, for instance, requiring the issuance of some sort of certificate—the alternative to compliance with the certification requirement is one that does not look very promising so far as the encouragement and development of aviation is concerned.

Many communities are holding on to airports by the skin of their teeth and if some substantial bar to continued operation were proposed by regulation, a large number of these would cease to exist.

There is another factor, a more important one; that is, the Administrator is given the responsibility for administering the Federal Airport Act; and the Federal Airport Act, which gives him the power to dispense moneys, the use of which can be insured to correct any flaws which the Administrator may find or any failures to comply with standards which the Administrator may develop, is so far more potent a tool in dealing with this problem that what has occurred is the Administrator, through his responsibility for the administration of the Administrative Procedure Act, has developed standards on the basis of which he will allocate funds made available through this legislation. Accordingly, all of the standards with respect to the design of airports are within various standards established by the Administrator and the Board has established none.

Mr. MEADER. Now let me get back to the question, Mr. Bakke.

First, I will call attention to the statement on page 2 of Mr. Durfee's statement, the first paragraph starting on that page:

The Board has worked closely with other agencies on airport problems regarding site selection, runway layout, airport utilization, and airport operations problems.

For instance, on the matter of site selection, not that it is exercising the power but does it have the power?

Mr. BAKKE. Sir, perhaps Mr. Newmann, of our General Counsel's Office, can elaborate more specifically on the statutory aspect; that is, whether there is statutory power.

Mr. NEWMANN. In issuing certificates of public convenience and necessity, the Board is directed, under section 401 (f) of the act, to specify the terminal points and the intermediate points. The term "points" is not defined in the act and, accordingly, what should be designated as a point is left to the discretion of the Board.

In practice, the Board ordinarily has designated as points a particular city, or in the case of two communities that are located in close proximity to each other has described the cities collectively as a single point. For example, Greensboro-High Point.

On certifications, the Board has not only designated a city or cities——

Mr. MEADER. Mr. Newmann, I think I know what you are talking about; you are talking about certification of an air carrier to give service; are you not?

Mr. NEWMANN. Yes, sir.

Mr. MEADER. Now I am talking about a question much broader than that.

Let me put it in this context, if, as I pointed out, a great majority—86 percent of these accidents, midair collisions—occurred within 5 miles of an airport and 93 percent occurred below 3,000 feet, and the collisions occurred in landing approach or traffic patterns, normal flights and takeoff climb, does it not appear that the location of major airports in a terminal complex might have a bearing upon the safety of operations in and out of those airports or upon the capacity of those airports? And does the Board have authority—wholly without respect to certifying an airline terminal—to adopt some general standards, if it could find some that were sound, in its legislative capacity or rulemaking governing characteristics and criteria for airports?

Mr. BAKKE. Sir, I think the answer to that is "No."

Mr. NEWMANN. That is right.

Mr. BAKKE. Section 6, which is the provision of title VI to which I had reference before, indicates that the Administrator is empowered to inspect, classify, and rate any air-navigation facilities; and "air-navigation facility" includes landing areas, and I am sure that this, broadly construed, includes airports.

The Administrator is empowered to issue a certificate for such air-navigation facility. This power to inspect, to classify, and to certify indicates clearly, at least in my judgment, embodies the power to lay down the conditions of certification, including siting and other things.

Mr. MEADER. I think perhaps I ought to have a statement from counsel on this.

Let me just take an example. Let's say that you could prove that in jet operations it was not safe to have major airports closer than 16 miles to each other, a figure I believe that was used in the Curtis report. But let's say the Board had come to the conclusion that in the interest of air safety and promoting the maximum capacity of our aviation or use of aviation facilities that it was desirable that major airports should be located at least 16 miles apart from each other.

Could you, through your rulemaking power, adopt such a regulation?

Mr. NEWMANN. I do not believe we could, Mr. Meader. I do not think the Board has that authority under the present act as it now stands.

Mr. MEADER. Well, then, I just would like to ask Mr. Bakke on this matter of the approach, in the light of the testimony that I read and the fact that there is a study underway now by simulation at the Indianapolis Laboratory of the CAA, whether he is confident that jet commercial airliners will not pose any problem in holding and approach patterns that is any different from our present propeller-driven aircraft?

Mr. BAKKE. Yes, sir; I am. I might illustrate that by saying we have airports now—we have the Bolling-Anacostia complex, and others—where traffic patterns must be established which are peculiar to that kind of an arrangement, which are inconvenient. They impose delays on airplanes getting in and out of each of those airports, but they are safe.

Now, the kind of criteria to which you refer are the kinds of criteria which would allow airplanes like our coming jet airplanes to operate in and out of airports without undue limitations with respect to traffic patterns. What I say is they can be accommodated; where the turning radii are sufficiently large to extend traffic patterns, certain limitations may have to be imposed, certain specific tracks over the ground may be required, but they will be safe, sir.

Mr. NEWMANN. I think we should make one more observation, Mr. Meader, that certainly the Board, by its control over the air carrier, could obviously require the carrier to serve a specific airport or not to serve a specific airport. So if we found a situation in the public interest or safety required a carrier not to serve a particular airport, for whatever reason may be involved, the Board, of course, would have the authoity to preclude that carrier from serving the airport.

Mr. MEADER. The only authority you have with respect to an airport would be your control over the carrier? And as far as your rulemaking power, you are satisfied that you have no such rulemaking power with respect to establishing criteria for airports?

Mr. NEWMANN. That is my view, sir.

Mrs. GRIFFITHS. Mr. Chairman, may I ask a question?

Mr. BLATNIK. Mrs. Griffiths.

Mrs. GRIFFITHS. When you give us the information on who asked for the change of the regulation for foreign-purchased airplanes, then will you also tell us if there has ever been an accident or accidents in the United States of a foreign-purchased airplane owned by an American company traceable to the change in rules?

Mr. BAKKE. We would be very happy to furnish that information.

(The following information was furnished:)

There has never been an accident traceable to the change in rules.

Mrs. GRIFFITHS. Then may I ask you a question? On page 6, you authorize the Administrator to designate high-density air-traffic zones in which certain speed control and communication rules apply.

Are you the people who set the control and communication rules? Do you set that?

Mr. BAKKE. Yes, ma'am.

Mrs. GRIFFITHS. And have you already determined the speed and communication rules before the Administrator designated high-density air-traffic zones?

Mr. BAKKE. Yes, ma'am. He requires our regulatory authority in order to make such designation.

Mrs. GRIFFITHS. And did you say that he had designated one and that was Washington, the National Airport, or not?

Mr. DURFEE. That was the first one.

Mr. BAKKE. That was the first one.

Mrs. GRIFFITHS. Have others been designated?

Mr. BAKKE. Yes, ma'am, and there are others in the process of being designated right now.

Unfortunately there were a large number published in the Federal Register within the past 30 to 60 days. I do not know whether all of them have yet been completed. There are approximately 35 in all, if I remember correctly, which are under consideraiton. Something in the neighborhood of a dozen to 14 are in existence now.

I would be very happy to furnish that more completely. I am sorry that I am not fully up to date.

Mrs. GRIFFITHS. That is perfectly all right.

Thank you.

Mr. BLATNIK. No further questions?

Mr. Plapinger.

Mr. PLAPINGER. Mr. Bakke, I was interested in your statement before that many communities are holding onto airports by the skin of their teeth. I am also interested in the fact that the Board is supporting the extension of the Federal-Aid Airport Act.

Were the comments of the Board on that legislation cleared with the Bureau of the Budget? Is that required of you as a regulatory agency, Mr. Durfee?

Mr. DURFEE. Well, we usually submit our comments to the Bureau of the Budget.

Mr. PLAPINGER. Are you required to submit comments on legislation to the Bureau of the Budget as a regulatory agency?

Mr. DURFEE. I would think we are. However——

Mr. PLAPINGER. May we have a copy of those?

Mr. DURFEE. We are not always necessarily bound by the actions of the Bureau of the Budget as to our comments.

Mr. PLAPINGER. I beg your pardon, sir?

Mr. DURFEE. We have not always been necessarily bound by the position of the Bureau of the Budget on our comments. The Budget might oppose a position which we take.

I think in several cases we have come before the Congress and supported legislation the Budget opposed and we favored.

Mr. PLAPINGER. Well, in those instances, sir, did the Budget Bureau say they had no objection to your sending these views to the Congress?

Mr. DURFEE. I think in some cases the Bureau of the Budget said they had no objections; in some cases they made no comment at all.

I think we have followed the practice of where we have a request from a committee of Congress to comment, that we will submit our comments.

Mr. PLAPINGER. Well, let me ask this specifically, then. There is a circular, Bureau of the Budget circular—I think it is A–19. I was

curious to know whether you are bound by the provisions of that circular.

Are you familiar with that, Mr. Newmann?

Mr. NEWMANN. Yes, sir.

Mr. PLAPINGER. The provisions of that circular?

Mr. NEWMANN. We do follow the provisions of Circular A–19. It was revised I think in September 1956, and we submit our proposals, our comments, to the Bureau of the Budget.

I might point out, in connection with the extension of the Federal Airport Act, we submitted our proposal to them and they indicated that this was not in accord with the President's program. I think that in the letter on the report, which we sent to both the Senate Interstate and Foreign Commerce Committee and to the Harris committee of the House, we indicated that the Board favored the proposed legislation, but that the Budget Bureau advised that this was not in accordance with the President's program and was opposed to it.

Mr. PLAPINGER. Has there ever been any instance in which the Budget Bureau said that they objected to the presentation of your views at variance with the administration to a committee of Congress?

Mr. NEWMANN. You mean they objected to us transmitting them to the Congress? I know of no such situation, sir.

Mr. PLAPINGER. In connection with your statement about many communities holding on to airports "by the skin of their teeth," has the Board ever made any study of the financial abilities of various airports?

Mr. BAKKE. Sir, not directly and as a general objective. We have, however, within the past 5 years explored whether the Board should require certain fire-fighting and rescue equipment at airports as a condition for air carrier service. We circulated a notice of proposed rulemaking setting forth certain detailed standards and asked for comments on the technical validity of requirements in particular, and, among other things, the capacity of communities and counties, and what not, to meet these requirements.

The response we got from this one proposal was very, very clear. I might just indicate, by way of comparison, that the standards which were proposed at that time—which were essentially in accord, although not identical with, the NFPA, the National Fire Prevention Association standards for airport fire protection—would have nearly, in terms of the annual budget required to furnish that fire-fighting equipment, exceeded the total budget for the maintenance and operation of approximately 87 percent of the airports of this country.

Mr. PLAPINGER. You are talking about smaller communities?

Mr. BAKKE. Yes; these are all smaller communities I am talking about.

Mr. PLAPINGER. How about the larger communities?

Mr. BAKKE. This has never been indicated to us as being a major problem.

Mr. PLAPINGER. I was interested because in the presentation before the Senate Interstate and Foreign Commerce Committee, there was a statement made by the Commerce Department concerning the fact that there was self-sufficiency or an increasing tendency to self-sufficiency by airports. This was given as a reason for opposing the enactment of the extension of the Federal airport aid.

Mr. BAKKE. I am able neither to confirm nor deny that, sir, with respect to the larger airports.

Mr. PLAPINGER. On page 2 of your statement, Chairman Durfee, you refer to the Airways Modernization Board and the fact that the Board has established direct liaison with that organization.

Is the AMB performing any research for the CAB?

Mr. DURFEE. Mr. Bakke, do you know of any specific research?

Mr. BAKKE. No, sir; not directly.

We have invited AMB to participate directly in agency efforts in development of our regulations.

They have participated on several of our accident regulation investigations. We had an AMB representative with us in London when we were looking into requirements there.

We were hoping to learn, as were they, more clearly what they could do to assist us in some of the work we are now doing in the field of development of regulations, investigation of accidents, and our international as well as national coordination efforts.

Nothing specific has come out of this in the way of a request by the Board for a particular research activity. We are still sort of trying to learn what the AMB has available for us and the extent to which they can accomplish research activities requested.

We have made no specific request.

Mr. PLAPINGER. Is the coordination required by section 2c of the Airways Modernization Act of 1957 being carried out to your satisfaction?

Mr. BAKKE. Yes, sir.

Mr. PLAPINGER. Apropos of safety-accident investigation, the Curtis report, at page 26, said that the Board does not have a field staff of "adequate size or competence" to study aviation operations in order to anticipate potential accidents and recommend steps to prevent them from happening.

Do you have any comment on Mr. Curtis' statement?

Mr. BAKKE. I have two comments to make, sir, on that. One, obviously, flows from what I trust the committee will understand as a natural bias on my part; I believe that the Board has technically one of the finest groups of qualified folks, especially in the field of accident investigation, that is available anywhere in the world.

So far as numbers is concerned, I think the committee should understand that the obligation of the Board with respect to safety is a "blue sky" obligation. There is no limit. It is not a matter of laying 800 bricks a day; there is no limit.

If an unsafe condition occurs tomorrow, it can very reasonably be charged to the fact that the Board did not have sufficient number of people to give attention to this particular subject.

With personnel limitations, priorities must be established. Priorities mean the elimination of certain activities which we might desire to take account of, but which we simply cannot because of limited personnel.

I am of the opinion we do not have a sufficient number of persons to handle adequately the entire accident investigation function.

The committee will realize that we have delegated a portion of this function to the Administrator, especially where it deals with smaller aircraft. The question of the extent to which additional personnel are

required to accomplish all of the accident investigation functions adequately is now being considered by the Board.

Absent a complete—in the sense of adequacy of numbers—staff for this purpose, part of the job has had to be delegated to the Administrator.

That is all I can say.

Mr. PLAPINGER. What you are saying is you need more people, but you disagree with Mr. Curtis as far as competence is concerned.

Mr. BAKKE. Yes, sir.

Mr. DURFEE. Might I say, I think I can speak for the Board, the Board itself would also disagree with Mr. Curtis.

Mr. PLAPINGER. Chairman Durfee, was the Board ever asked to comment on the Curtis report?

Mr. DURFEE. No.

Mr. PLAPINGER. Either during its preparation or after the report was issued?

Mr. DURFEE. No.

Mr. PLAPINGER. You have never submitted any comments on the Curtis report to any——

Mr. DURFEE. I discussed—the only discussion that I recall I ever had with Mr. Curtis was on the Airways Modernization Board, and we subsequently supported that legislation. We were never asked to comment on the Curtis report, the general report.

Mr. PLAPINGER. On page 6 of your statement, Chairman Durfee, in item 3, the last sentence, you say:

It is anticipated that the continental control area will soon be lowered at least to 15,000 feet.

In testimony that Mr. Pyle gave us, I believe yesterday or the day before—July 22, at page 329 of our hearing, I refer to the fact that—

In Jet Age Planning No. 3, there was a proposal to drop this to 15,000 by the middle of the year.

But Mr. Pyle said that that was premature at the time.

Do you have any knowledge of that situation?

Mr. DURFEE. I do not know how soon this will be accomplished.

Mr. Bakke, do you have any estimate on that?

Mr. BAKKE. Yes, sir. This will require a little bit of explanation.

Sir, during the past several years, there had been rather good agreement among the principal agencies that are users of airspace that our development of a positive control system should be accomplished on what is called an area basis; that we would invade the higher altitudes, altitudes above 24,000 feet; and that when facilities and personnel, and procedures permitted, we would some day extend positive control—gradually perhaps, but throughout all of the airspace.

Last year—it had become increasingly apparent for several years, but last year it was crystal clear that it would be impossible for us to extend positive control throughout all of the airspace now designated as continental control airspace. This was especially true because we realized that at the end of this year, 1958, we would begin to get jet air transport aircraft, that at least in some of our opinions could not operate successfully outside of positive control airspace. Therefore the Board found it necessary to make a substantial change in this concept, at least on an interim basis, and it said we had to move into a positive control program which was based on a route concept; and,

therefore ,in our special regulation, which was adopted earlier this year which was implemented by the Administrator on the 15th of June, certain types of airspace across the United States was designated.

This is the introduction of positive control in a portion of the high altitude airspace, because we have decided to proceed with the designation of positive control routes instead of throughout the continental control area. There is no longer the urgency to expand the continental control area downwards that was considered to exist about a year ago.

Whether in fact there is any need at all to come down to 15,000 feet is under consideration right now, the question being should we expand the routes which have already been designated for positive control, leave the continental control area where it is until we are ready to apply positive control throughout the entire continental control area above 24,000 feet, and then consider coming down. This is the question we have before us now.

The answer simply is the urgency does not exist any longer.

Mr. PLAPINGER. In connection with the delegation under CAR 60–9, the attention of the subcommittee was brought to a proceeding before the Air Space Division of the Air Coordinating Committee that would affect an area that is half of Wisconsin, half of Michigan, half of Indiana, and a good part of Illinois, for 4 days a week, from August 20 to October 17, for the hours between 1 and 4 a. m.

We are told this would affect something like 33 flights daily, plus 2 nonstop flights, and some 15,000 passengers would be required to sit on the ground for 3 hours during this "exercise."

And, incidentally, the exercise is classified.

In connection with that designation, the Administrator used the Air Coordinating Committee as a forum and the Air Space Division made recommendations to the Administrator based on the information gotten at that forum.

Now, I was interested in this recommendation technique being used, in view of the fact you may recall that at our hearings in May there was some time spent by the members in questioning Mr. Durfee about the power of the Air Coordinating Committee in connection with this delegation under CAR 60–9.

Mr. Bakke, I believe you said, in answer to a question from Mr. Hardy, that "there would be no finding of the Air Coordinating Committee."

I am interesting in knowing what your thoughts are on this recommendation technique in view of your statement at that time.

Mr. BAKKE. Sir, I believe we have a copy of the procedure before us.

The procedure which the Administrator published is part 409, which governs cases of this sort.

The principal sense of my comment at the earlier hearing of the committee had to do with paragraph D of 409.23. There I think it is very clear that the Administrator is burdened to make the final decision independent of or regardless of the views that had been expressed by the Division as a whole or by any member of the Division.

The recommendations which are received by the Administrator from the Division differ in my opinion very little from the kind of recommendations that are received by the Board on a notice of proposed rulemaking from a body like the General Aviation Facilities Planning Group, which is a group represented by about a dozen small aircraft operators.

Mr. PLAPINGER. You do not think that the burden would be increased by reason of the fact that a number of Government agencies made a recommendation in concert?

Mr. BAKKE. Sir, I would say this: That whatever the coordination technique is, the extent to which it guarantees the broadest possible representation of aviation, to that extent its recommendation is more persuasive.

If the ACC could guarantee bringing to the Administrator the views of every single interested person, without exception, then obviously the objectives of the Administrative Procedure Act would be carried out in full without the need of any other procedure. This is not quite the case. I say that the ACC recommendation is the more persuasive upon the Administrator because it is more representative of a larger segment of aviation. But it does not relieve the Administrator in any respect of the obligation to make the final decision as he sees the record.

Mr. PLAPINGER. Under section 60–13, the Board, upon its own initiative, may review any action of the Administrator taken pursuant to the delegation of this authority.

Has the Board done that as a matter of fact?

Mr. BAKKE. There has been no review under the regulations as it has been amended.

The particular case to which you refer, for instance, was brought to the Board's attention. The Board formally, in a formal Board meeting, considered the action of the Administrator, recognized that it was the broadest and most far-reaching use of this authority which, to the Board's knowledge, had been taken to date; considered whether it was inconsistent with existing Board policy; decided it was not, and no further review was carried on.

That was the nature of our consideration. It has been considered and no formal review has been made.

Mr. MEADER. Would that amount to ratification of the decision of the Administrator by the Board?

Mr. BAKKE. Well, sir, there was no formal decision. I mean the Board did not actually submit a proposal to ratify or something of that nature. It merely agreed that, having looked at it, there appeared to be no reason to take any adverse action with respect to the Administrator's contemplated action.

Mr. MEADER. The fact it did review it and did not reverse the Administrator would be an implied ratification; would it not?

Mr. BAKKE. I think the Board made it clear, sir, that they did not dispute the propriety of the Administrator's action.

Mr. DURFEE. I think that is a correct assumption, Mr. Meader.

Mr. PLAPINGER. Now, then, in connection with jet aircraft, have you established any standards on cockpit visibility?

Mr. BAKKE. Yes, sir; we have, and we have those standards under consideration right at the moment. As a matter of fact——

Mr. PLAPINGER. You mean revision of those standards?

Mr. BAKKE. Yes, revision of those standards is under consideration right now.

We have in our proposed agenda for the 1958 Annual Airworthiness Review one item which includes reconsideration of our present cockpit vision standards.

The Annual Airworthiness Review is scheduled for the week of September 10. On this occasion, all of the manufacturers and operators and so on come in and sit down with us to consider in great detail specifically what amendments are required.

Mr. PLAPINGER. During our preparation for these hearings, we were told that the Air Force, in a special report, had found cockpit visibility in the KC–135 unsatisfactory.

Were you aware of that?

Mr. BAKKE. I am not aware of that report, sir.

Mr. PLAPINGER. You are not?

Mr. BAKKE. May I ask if this is the report of the Westover accident?

Mr. PLAPINGER. I do not know. It allegedly is in special report No. 5 of the Air Force.

Mr. BAKKE. I am not familiar with that report, sir.

Mr. PLAPINGER. Incidentally, in the report on the Brunswick accident, there is a statement to the effect that—

Cockpit visibility restrictions in the Viscount and difficulty in observation from the T–33 at wide starboard angles contributed to inadvertent collision.

Are you familiar with that?

Mr. BAKKE. Yes, I am familiar with that report.

Mr. PLAPINGER. Have your accident investigations of the Nellis crash and the Brunswick crash been completed?

Mr. BAKKE. Sir, in a technical sense, of course, investigation is never completed. As a matter of fact, however, a report is now being considered by the Board.

Mr. PLAPINGER. On which crash?

Mr. BAKKE. On the Nellis.

Mr. PLAPINGER. Nellis crash? When is it anticipated that the report on the Brunswick crash will be considered?

Mr. BAKKE. Unfortunately I do not recall what our scheduled date is.

Mr. PLAPINGER. Could you furnish that for the record?

Mr. BAKKE. Yes; I would be very happy to. I would say that, perhaps within the next 2 or 3 months, it will be in.

(The following information was subsequently supplied:)

On or about September 24.

Mr. PLAPINGER. On page 13 of Chairman Durfee's statement, there is a reference to a flight recorder which will be required after July 15, 1958. Was this flight recorder ever evaluated by the NACA?

Mr. BAKKE. No, sir; not by the NACA. And when I say it was not evaluated, I mean there was no formal technical analysis accomplished. It was evaluated by the Technical Evaluation Center of the CAA at Indianapolis.

At the time the regulation was proposed, the comments of NACA were sought because NACA has a great deal of interest in flight-recording programs. The NACA commented in rather great detail about certain of the characteristics of the instrument.

Now, in order to have that knowledge of the instrument, they must have had some examination, but the extent to which this could be called a service test or detailed evaluation, I am not sure. They have detailed knowledge of the instrument. I would not call their examination of that instrument a technical analysis on behalf of the Board.

Mr. PLAPINGER. Were the comments of the NACA approving or disapproving of this recorder?

Mr. BAKKE. Sir, the NACA took the position that the flight recorder—that is, the flight recorder proposed to be required by the Board—did not possess the precision required to furnish information which they sought. Their interest was essentially to insure that the Board's objectives in getting flight recorders on airplanes would not mean that their own flight recorders would no longer be carried.

Now, with respect to this view, the Board's position simply was, if the NACA had been successful in getting the air carriers to carry NACA flight recorders in the past, we trust that they would continue to be persuasive to that end in the future. We certainly had no intention of replacing these with the Board-required flight recorders. These are for a different purpose.

Mr. PLAPINGER. Could you make a copy of the NACA statement or comments available to the committee?

Mr. BAKKE. I would be glad to.

(The following information was furnished:)

On March 2, 1956, the Director of the Bureau of Safety Regulation requested the National Advisory Committee for Aeronautics to comment on the following:

(*a*) "If a commercial flight recorder were made mandatory, and assuming that the flight-recorder records are available and that the accuracy of the recorded data is within the limits indicated in the enclosed copy of a proposed draft of the CAA specifications dated November 10, 1954, would the NACA have use for these data in their atmospheric-gust research?

(*b*) "Irrespective of the use of any commercial-type flight recorder, does the NACA intend to continue collecting gust data? If so, to what extent?

(*c*) "What uses, other than in accident investigation, would such a recorder have, considering the specifications of the flight recorder, the data to be collected, and the proposed disposition of the data; i. e., merely to be preserved for 30 days?"

On April 20, 1956, the NACA's reply was received, stating that the instrument is not suitable for gust research. The primary shortcomings of the instrument in relation to collecting research data are:

1. "The record speed of 3 inches per hour is too slow to permit discrimination between gust-acceleration peaks.

2. "The required high g. range for the small record width suggests that it would be exceedingly difficult to obtain information on the many small gusts of interest in gust studies.

3. "The aluminum-foil type of record is not suitable to available record-reading equipment.

4. "Installation of the recorder in convenient locations, such as the airplane tail cone, would lead to erroneous gust-acceleration data."

In addition, the NACA stated that, "whether commercial flight recorders are or are not used in transport airplanes, we intend to continue our program of collecting VGH data from airplanes, particularly for the newer type transport airplanes. Our present VGH program includes about 10 installations in airplanes such as the 1049G, DC–7, Viscount, and M–404 to obtain information on the operating practices and to evaluate such factors as the use of airborne radar on gust and load histories. It does, however, appear that, if the airlines are required to carry a flight recorder for use in accident studies, some method would be needed for substituting the required number of recorders for these instruments. Otherwise, adequate cooperation with the airlines in the NACA VGH programs may be difficult to maintain because of apparent duplication of instruments.

"Because of the factors previously discussed, it is difficult for us to foresee uses for data collected by the proposed flight recorder other than in accident investigations. In addition, the data might be of questionable accuracy for research purposes because of the problem of adequate maintenance and calibration of the large number of recorders in question."

Mr. PLAPINGER. Chairman Durfee, one last question. In a newsletter, called Washington Report, there is a statement that the—

record total of 36 cases on appeal are pending before Civil Aeronautics Board. In 36 instances, applicants for pilot licenses, including renewals, have been rejected by Civil Aeronautics Administration medical division on recommendation of examining physicians, only to have medical findings overruled by CAB hearing examiners, who are lawyers.

Incidentally, this publication is dated March 1958.

It goes on to say:

Appeals have been piling up in CAB for the past 18 months. Fact is that at least 2 or the 36 principals have died in the meantime.

The question really relates to the delay in the administrative process where, possibly, a man's livelihood is at stake, and I am wondering what the status of the CAB's calendar involving these cases is at the present time?

Mr. Chairman, this was not one of the items that was indicated in our invitation, and it may be that you want to furnish this for the record.

You might specifically give some attention to the tables that are contained in the Annual Report of the Office of Administrative Procedure of the Department of Justice, 1957, at pages 18 and 25, concerning the time lapses with respect to the hearings on these matters that we have just been discussing.

Mr. DURFEE. We will be glad to furnish that information.

(The following information was furnished:)

The 36 medical cases referred to were the subject of appeals from the Administrator's denial of medical certificates or requests made to the Board for waivers of part 29 of the Civil Air Regulations.

Prior to June 1957, the Administrator followed a policy of denying medical certificates in cases where there existed a bona fide history of psychosis, epilepsy, diabetes, or coronary disease. In view of the numerous requests for relief from the Administrator's refusal to grant medical certificates, the Board decided it was necessary to reevaluate part 29 of the Civil Air Regulations. After considerable study of this matter, the Board felt that the construction placed upon part 29 by the Administrator was probably too harsh in that persons capable of safely exercising the privileges of an airman certificate were unnecessarily being denied that privilege. Under the circumstances, the Board issued a Notice of Proposed Rulemaking to determine whether appropriate changes should be made in the Civil Air Regulations.

After consideration of the views submitted by all interested persons, the Board in June 1957, amended part 29 of the Civil Air Regulations by providing for the issuance of limited medical certificates to applicants who failed to meet the prescribed medical standards but who nevertheless, in the opinion of the Administrator, could perform the duties and exercise the privileges of an airman on a limited basis without compromising air safety. Thus a history of psychosis, epilepsy, diabetes, or coronary disease is no longer automatically disqualifying; instead, the revised regulation permits the Administrator to evaluate each case and to apply whatever limitations he may deem necessary for the issuance of a medical certificate.

Having removed the previous limitations which confronted the Administrator, and in order to minimize the burden of further evidentiary hearings upon the applicants, the Board on December 13, 1957, requested the Administrator to review these medical cases and to reevaluate the current physical condition of the individuals to determine whether they are entitled to medical certificates. In asking the Administrator to reappraise these cases in the light of the revised regulation, the Board was hopeful that, in many instances, the matter might be resolved expeditiously and favorably to the applicants without the necessity of further proceedings. However, on February 27, 1958, the Administrator advised the Board that notwithstanding the revision of part 29 of the Civil Air

Regulations, he would not alter his previous decisions in these cases. This, of necessity, required the Board to reopen these cases in order to develop a factual record to determine whether the applicants are entitled to medical certificates. The Board decided to follow this procedure in order to minimize the burden on the applicants. In other words, instead of requiring the applicants to apply de novo to the Administrator for a medical certificate under the new regulation, the Board reopened the old proceedings in order to bring the records up to date, thereby substantially shortening the procedural requirements and the time required for final decision. Of the 36 cases, the rehearing before the examiner has been completed in all but 6 cases, and these are scheduled for rehearing this month.

As you are doubtless aware, an appeal to the Board under title VI of the Civil Aeronautics Act from the Administrator's refusal to issue an airman certificate is an adjudicatory proceeding within the meaning of the Administrative Procedure Act. This requires that the individual be given a full and complete opportunity to be heard and that the decision be decided by the Board pursuant to the strict requirements of that act. In establishing procedures for the disposition of these proceedings, the Board has been careful to provide the applicant with a full and complete opportunity to present his case. The case is assigned to a hearing examiner who, after giving the applicant an opportunity to participate in an evidentiary hearing, issues an initial decision. If no appeal is taken to the examiner's initial decision, it becomes final. The parties are permitted, however, to appeal from the initial decision to the Board. Such an appeal is accompanied with the filing of briefs to the Board, and in cases involving substantial issues, the parties are permitted to present oral argument before the Board.

The Board has been very much concerned with this problem and has taken the aforementioned steps in order to make sure that no individual is deprived of the right to fly if he is currently qualified to do so. You may be sure that the Board will continue to make every effort to dispose of these cases as rapidly as possible.

Mr. BLATNIK. No further questions?

Mr. Durfee, thank you very much.

Our next witness for this morning, Gen. E. R. Quesada, Chairman of the Airways Modernization Board.

Good morning, General. We welcome you, your assistants, and your staff.

STATEMENT OF HON. ELWOOD R. QUESADA, CHAIRMAN, AIRWAYS MODERNIZATION BOARD; ACCOMPANIED BY MAJ. LAWRENCE C. WRIGHT, DIRECTOR OF DEVELOPMENT; LT. COL. CARL B. FISHER, ACTING TECHNICAL DIRECTOR; AND DONALD G. SCHULER, EXECUTIVE OFFICER

Mr. QUESADA. Thank you.

Mr. BLATNIK. General, I see you have a prepared statement.

Do you have any preliminary remarks?

Mr. QUESADA. It is short, Mr. Chairman, if you would like for me to insert this in the record——

Mr. BLATNIK. Perhaps you could read it. It is a short one, it would be easy for all of us.

Mr. QUESADA. All right.

Mr. Chairman and members of the committee, I welcome the opportunity to appear before you today to discuss the operations of the Airways Modernization Board.

The Airways Modernization Board was established on August 14, 1957, and operates under the provisions of Public Law 85–133. Our

primary directive and charter are contained in section 2 (b) of that act, reading in part as follows:

> **The Board shall develop, modify, test, and evaluate systems, procedures, facilities, and devices, as well as define the performance characteristics thereof, to meet the needs for safe and efficient navigation and traffic control of all civil and military aviation except for those needs of military agencies which are peculiar to air warfare and primarily of military concern, and select such systems, procedures, facilities, and devices as will best serve such needs and will promote maximum coordination of air-traffic control and air-defense systems * * *.**

The Board is "joint" in character. The Board's main effort is directed toward unifying the technically complex task of research and development essential to the efficient management of air traffic, both civil and military. The technical difficulties are compounded by the necessity of meeting the needs of diverse groups—all of which have legitimate claims.

The civilian personnel employed by the Board are subject to existing civil-service regulations. The military personnel are assigned to the board by permanent change of station orders, and approximately 15 percent of the staff are uniformed personnel. However, I wish to emphasize that they are not liaison personnel or representatives of their services. Their loyalty is to the Board, and they are subject to its direction.

I stress this point to demonstrate that the Board is truly a joint activity and is not devoted to any special interests, but is dedicated to optimum solutions essential to the needs of the civil and military users.

The Airways Modernization Board is an independent research and development organization which provides for modernization of the Nation's system of navigation and traffic control facilities to serve present and future needs of civil and military aviation.

Prior to fiscal year 1959, no funds were appropriated specifically to the Airways Modernization Board. In fiscal year 1958, approximately $15.1 million were transferred to the Board through the medium of transfer orders in accordance with section 4 of Public Law 85–133. The Department of Commerce transferred $1.3 million in transfer order No. 2, and the Department of Defense transferred $13.8 million of these funds in transfer order Nos. 1, 3, and 4—in order to allow the Board to pursue research and development of the common system concept. Of these funds, the Board has obligated $14,970,000 by June 30, 1958, or approximately 99 percent of the funds available.

During the first 10 months of the operation, the Board unified the bulk of the research and development effort in the fields of air-traffic control and navigation toward a single goal of modernization of the Nation's airways to meet all user requirements.

The Airways Modernization Board has embarked on a broad program designed to provide operational improvements to the air traffic control system between 1958 and 1963. This program is now in full progress and is known as the AMB 5-year program.

In addition, we are embarking on a long-term research and development program designed to meet the aviation demands after the 1958–63 period.

An important endeavor in fiscal year 1958 was the location and activation of the National Aviation Facilities Experimental Center to test and evaluate the systems, procedures, and devices that are sub-

mitted to the Board for final selection. More than 1,800 sites were examined, and the naval air station at Atlantic City, N. J., was acquired for this facility.

Another program of great importance—initiated during fiscal year 1958—is aimed at the maximum integration and utilization of the facilities of the Air Defense Command system and the air-traffic-control system.

In fiscal year 1958 effort was expended on approximately 88 projects, all of which are designed to contribute to improving the operational effectiveness of the Nation's airways and traffic-control system.

For your information, a copy of a program and progress report of the Airways Modernization Board's first 6 months of operation is submitted. This report covers our research and development activity, our organizational structure, and a summary of active projects and tasks that were underway then.

I think you have these before you [indicating].

Mr. BLATNIK. Yes.

Mr. QUESADA. That is all I have prepared, Mr. Chairman.

Mr. BLATNIK. General, would you give us—without going into detail—an idea of the nature of the 88 projects?

For example, what proportion of those were military, essentially military projects pertaining to military air-flight operations, and which are civilian?

Mr. QUESADA. Well we do not think of any of our programs as being military or of any of them being civilian. We think of all of them as being essential to the Nation's needs.

Now although there are 88, or approximately 88, programs underway, there are about 5 that dwarf the others.

One is a traffic-display system, the data processing and display system. This is basically the heart or the framework on which a traffic-control system will have to be built.

This system is perhaps our most expensive system, at least we have more money in it than any other. And it provides for processing in usable form by the application of computer techniques the abundance of data that are in fact gathered by radar and other means in some cases oral; making these data available to the controller and permitting him to apply the fact of human decision. This is, as I say, our most extensive program.

It is our plan to put this facility or equipment in the New York area. I think it is worth while to mention a few words on why we are putting it there.

By putting it in the New York area, it forces us to develop it under conditions that are real and not simulated. It forces us to be subject to the maximum degree of frustration. It forces us to be subject to the realities of life, as differentiated from developing it in a vacuum of a remote laboratory on the other end of the spectrum.

In addition, in this area there is a high density military base at Suffolk, on Long Island. There is also a fairly high density general aviation base in Connecticut, in Westchester. So therefore——

Mr. PLAPINGER. Westchester—Pennsylvania or New York?

Mr. QUESADA. Westchester, N. Y. So this gives us the opportunity of applying it to all the users at one time.

However, the main attraction was LaGuardia and Idlewild. In addition to being subjective to reality, we have in mind that when

it is ready for use, it is the area that needs the most. So, therefore, it can be applied soonest. Then we can go out and order the production items and at some later date change this equipment for one with shiny new black boxes.

Another significant program is our data-link program. All of you who are interested in this problem realize how the radio spectrum is jammed with conversation. We are applying in this case some techniques that were developed by the military called data link; which in effect means, Mr. Chairman, that you take a long conversation and compress it into a microsector, transmit it in digital form; on the other hand, stretch it out into meaningful language.

It is our opinion that if this could be done with approximately 80 percent of the messages that now clog the radio spectrum, we would be saving a remaining 20 percent for emergency and other unique uses, and would be making a real and general contribution.

Another program that has been conducted is one in which we use University of California to develop some data on high-speed turnoffs. All of us have talked about high-speed turnoffs and have some intuitive opinion. Our objective in this case is to develop opinion and data beyond the intuitive which are factual and measured as a result of experimentation.

This program has for all practical purposes been completed. The data are now being compiled, and I think it is fair to say that they are pouring concrete at Idlewild in response to some of the data gained from it.

There is another program that is very significant, and that is the development of simulation equipment and the establishment of simulation techniques that would permit us to come to conclusions without going to the vast expense of prolonged experimentation. This is the development of a simulator that is fairly sophisticated in terms of current technology that permits us to perform all the elements of the management of air traffic without in fact having air-traffic itself. However, it can be mixed with real traffic or simulated traffic and the controller would never know the difference. It is designed not only to save time, but to save money.

Now, the integration of the air defense system and the traffic-control system is designed fundamentally to satisfy this general statement. The Military Establishment has a vast surveillance system.

Mr. PLAPINGER. Is this SAGE?

Mr. QUESADA. It is the air defense system. SAGE is the simulated part of it. For all practical purposes, we are addressing ourselves to the SAGE system because that is the coming system.

The SAGE system will have a surveillance system upon which the Military Establishment has spent more than a billion dollars—considerably more than that and perhaps twice that much.

Now, from our point of view surveillance is an essential element to traffic control. It seems wise to me—and I am sure it would to you—it should not make any difference from where this surveillance comes as long as it is adaptable.

Mr. PLAPINGER. I think the chairman and Mr. Meader might be interested in the cost of the SAGE system if we are not getting into security matters.

Mr. QUESADA. I have referred to it. Now, I think I missed the point. "Surveillance," Mr. Chairman, for all practical purposes,

means their radar net, and they will have a couple of billion dollars in this by 1963, in operating and capital cost.

Now you will have to take my word for it, Mr. Chairman, I suppose, unless you are technically qualified, that all the surveillance equipment in the world is useless to you unless you are able to process the data. It has more data than one knows how to use. It is not in a meaningful form. So, therefore, there is another element to the SAGE system which is significant, and that is the processing of the data in that it is processed by the application of computer techniques.

Now, the processing system, the processing function is largely performed by a computer referred to as the FSQ computer. This equipment, when the SAGE system is complete, will be comparable in cost to the surveillance system. Therefore, it is another $2 billion.

It is our attitude that the Government should now reproduce this. We should make it available wherever possible.

An agreement has been reached between the Department of Commerce wherein both of these functions that these two elements perform is available to us to be adapted to our traffic control system, and the intelligent adoption of this equipment is in itself a very severe technical task. So that in itself is a complex program.

There are major tasks, Mr. Chairman—I could go on almost indefinitely, but I think unless you want to pursue some other specific point, I might let it rest there.

Mr. PLAPINGER. May I ask one question?

Mr. BLATNIK. Mr. Plapinger.

Mr. PLAPINGER. One of the areas, General, the committee has been interested in has been in the VORTAC situation.

On page 35 of your February report, there is a reference to the fact that—

There are a number of miscellaneous improvement areas of both VOR and TACAN elements requiring development effort.

Can you address some remarks to that general subject?

Mr. QUESADA. Yes. First let me say we consider VORTAC as equipment that is in service. We are not engaging in research and development in the area of VORTAC.

The CAA is responsible for installing the approved system on the approved sites and operating them.

VORTAC is one element, one navigational element, and we consider that it is going to be in existence; so we assume the attitude that the data that the airplane can gather by using VORTAC, which gives him his position, we must develop our equipment so that it can accept and digest and use those data. It is one input to the data processing and display system.

Now we are not engaging in any research and development related thereto.

Mr. PLAPINGER. Perhaps, General, it might be well if you would delineate the difference in the research functions of CAA and your own agency.

Mr. QUESADA. Right.

Well, we do not consider that the CAA performs research. In order to make some logical dividing line between their function and ours designed to avoid unnecessary and destructive duplication, we

conform to the Curtis concept that phase 1 would be a CAA responsibility; phase 2 and phase 3, ours.

Phase 1 is that responsibility that the CAA has to bring improvement to equipment that is on hand and is being used. I feel that we should not look over—we should not heckle them and harass them, because they have the everyday and difficult problem of running and managing the airways. They have purchased certain equipment, and bringing improvement to existing equipment is their responsibility.

Now, in phase 2 it is up to us, through processes of research and development and testing, to develop equipment that is not yet in being. We have divided this area into two areas, phase 2 and phase 3.

Phase 2 is that area of research and development that permits us to bring into being devices within the state of the art, without going to new inventions.

Commerce—I mean business—over the past years has developed many devices and processes, technical in nature, that could conceivably contribute to our task.

The Military Establishment obviously has spent vast sums of money in the development of devices that could contribute to our task, and so we go to these already developed devices and extract from them any use that can be applied to this problem. The data processing and display equipment is within phase 2. Data link is within it. All these programs I have discussed are within phase 2. We are exploiting the state of the art without going to the trouble of inventing something that has already been invented.

We confine that to a 5-year period. Having been in this research and development for a long, long time, Mr. Chairman, I know that those engaged in it are always trying to postpone. So if you find a fault with establishment of a 5-year period, you must blame me, because I was a little bit arbitrary on this point. However, from my experience, I said we have got to stop some place and we will stop at the end of 5 years. We will not start anything that cannot be a useful product in 5 years.

Now, in respect to phase 3, Mr. Chairman, those research and development programs are programs that are uninhibited by the state of the art. They permit new invention. They permit something that has never been tried or never been thought of. And it relies on the ingenuity and imagination and inventiveness of the scientific community.

Now, there is one program, sir, I forgot to mention, that is significant along with our data processing. I must mention it because it is so significant. That is three-dimentional radar.

It is my opinion, and I think the opinion of my staff, that the management of traffic in a terminal area when giving consideration to the volume that we now have and should expect is basically imposisble without three-dimensional radar.

The radar that most of us are accustomed to and have heard discussed or seen and is now in use is two-dimensional. It will give you the location and range and nothing else. Within the terminal area, I am thoroughly convinced, sir, this problem can never bring real solution until we have radar that can give you altitude.

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Now, the Military Establishment has spent vast sums of money in the development of 3–D radar, and with modest success. However, their specifications require three-dimensional radar to ranges on the order of 300 miles. Our requirements are on the order of 50 to 75 miles.

Now, as soon as you reduce the requirement of 3–D surveillance from 300 miles to 75 miles, you cut the difficulties of the problem down to about one-tenth, and you make it significantly easier.

So we have surveyed all the military programs and are extracting from them those that offer the most promise in 3–D radar of the shorter range and are devoting our attention to that, without going through the tortuous task of trying to invent it again. So I must say that is one of the significant programs.

I have left VORTAC. I did not mean to. If you want to go back to it——

Mr. PLAPINGER. No, that is all right.

Mr. MEADER. Mr. Chairman, may I ask a question?

Mr. BLATNIK. Mr. Meader.

Mr. MEADER. General Quesada, I notice on page 37 of your report of February 14—I guess the report is dated in March—"Airport Program," one heading, then you have "Future Airport Facilities."

I glanced through the various subheadings under that and did not find anything dealing with the separation of airports.

Are you taking any interest in that question in the light of faster and larger planes that will come into use?

Mr. QUESADA. Our area of interest in airports is to a large extent devoted to the development of proper and improved configurations, the layout of runway versus runway, the separation between runways, the extending of our knowledge in the area of high-speed turnoffs, and things of that character.

Our program provides for what we call breadboard runways. We have planned and anticipated laying steel runways and experimenting with their location. When we have finished with it, we can lift it up and put it some place else to make it cheaper and easier and permit us to apply the process of analysis.

In terms of the spacing of the runways, our efforts are confined, as indicated in the Curtis report; that we must develop additional data relating to proper spacing between them. And another part of our airport-improvement program, although at first sight it might not appear to relate to the airport, we are developing improved traffic patterns and improved procedures for getting aircraft into runways.

It must be clear that holding at an airport might well be attributed to a lack of facilities on the airport. Your problem is really on the ground and expresses itself in the air.

Now, this could in some way be related to the difficult traffic problems that are raised by the proximity of other airports and we are engaging in analysis and some experimentation in this area.

Mr. PLAPINGER. Have you done any work, General, in connection with the runway configuration at Chantilly, for instance?

Mr. QUESADA. I have not.

Mr. PLAPINGER. Has the Board been called in on that problem at all?

Mr. QUESADA. It has.

Mr. PLAPINGER. Can you tell us something about it?

Mr. QUESADA. Well, I personally am not too familiar with it.

Who has been working on that problem, anybody here, with the CAA?

We have working for us a Mr. Ernie Cutrell, an airline pilot of long experience. Through his experience, he has, for reasons of his own, been very interested in problems of this kind. He has been on a panel that is working with the CAA with a view to discussing with the CAA the layout and configuration of the Chantilly Airport.

I have talked to him about it personally. He has expressed some concern over the present layout, as it is presently proposed I should say, because there is no layout as far as I know determined or decided on.

I understand that he has discussed with them the proposed layouts. I also understand that they have been receptive to his ideas and those objections and points that he raised. However, the final responsibility of the layout at the Chantilly Airport rests with the CAA.

Mr. PLAPINGER. Well, would we be able to get through you from Captain Cutrell the objections that he has to the layout at Chantilly?

Mr. QUESADA. I can tell you right now what they are.

He is commenting on a proposed layout.

Mr. PLAPINGER. Right.

Mr. QUESADA. As I understand, the proposed layout is two runways parallel, running north and south and a single runway running east and west.

Mr. BLATNIK. Bisecting or intersecting?

Mr. QUESADA. They do not bisect, no, sir.

I could draw them if you would like.

Mr. BLATNIK. How do you visualize them?

Mr. QUESADA. The two north and south are like that [indicating]——

Mr. BLATNIK. Staggered?

Mr. QUESADA. And east and west over here like this [indicating].

He feels that consideration should be given, No. 1, to moving the north-south around to the northeast to southwest, in other words rotating it about 15 degrees to the right; and also rotating the east-west about 30 degrees to the right.

He has also discussed with the CAA rotating one of the north side runways 15 degrees and the other one 30 degrees, which has some merit.

And he also gives some support to the idea of parallel runways in the east-west direction as well.

That is substantially what his program is, and I am sure it is being considered.

Mr. PLAPINGER. General, there is a great deal of your work, as I understand it, that is contracted out to private firms.

Is that accurate?

Mr. QUESADA. Oh, the vast majority is contracted out.

Mr. PLAPINGER. Can you tell us as of the end of the past fiscal year what the total of those contracts were?

Mr. QUESADA. Of contract work. Of our $15.1 million, $12,622,000 is contracted for.

Mr. PLAPINGER. I believe in your statement you mentioned uniformed personel.

Are these uniformed personnel assigned to you indefinitely, or are they subject to the regular rotation policy?

Mr. QUESADA. They would be subject to the regular rotation policy, but they are not assigned to us for any specified period of time.

Mr. PLAPINGER. How many people do you have on your staff at this time, both uniformed and civilian?

Mr. QUESADA. Why do you not answer that?

Mr. SCHULER. We have 200——

Mr. PLAPINGER. Would you identify yourself for the record, please?

Mr. SCHULER. Schuler, executive officer.

We have on our staff at this time 204 people; of those, 170 are civilians, 32 are military. There are two more civilians that are detailed to the agency not yet on our payrolls.

Mr. PLAPINGER. I see.

Mr. SCHULER. We borrowed them from another agency, from CAA.

Mr. PLAPINGER. How many of the so-called professionals are in that total of 170, do you know? Would you furnish it?

Mr. SCHULER. I do not have that. It is approximately 2 to 1.

Mr. PLAPINGER. Approximately 2 to 1.

Mr. QUESADA. Two civilians to one military personnel?

Mr. SCHULER. No; the question I think is professionals to clerical. It is about 2 professionals to 1 clerical.

Mr. PLAPINGER. I see.

In your transfer order No. 4 with respect to transferring unto the Board the functions of the Department of Defense, there is a proviso that:

> This transfer shall not be construed to impair in any way those functions of the Air Force which are, in accordance with section 2 (b) of the Airways Modernization Act, deemed to be concerned with meeting needs peculiar to air warfare and primarily of military concern.

How do you determine what are deemed military and what are deemed other than military?

Mr. QUESADA. The Board determines, by vote.

Mr. PLAPINGER. That is pursuant to the statute?

Mr. QUESADA. That is law.

Mr. PLAPINGER. Has there been any instance in which the exercise of your statutory authority has met with any reluctance on the part of any of the agencies concerned?

Mr. QUESADA. I cannot think of any.

Mr. PLAPINGER. Mr. Chairman, I have no further questions.

Mr. BLATNIK. Any further questions?

Mr. MEADER. I have 1 or 2.

To get back to my airport question, I rather gathered from your reply to my question before that the matter of separation of major airports in the terminal complex is not a matter which you are giving any attention to.

Mr. QUESADA. No; under contract I do not think we are.

Major WRIGHT. I am Major Wright. I am Acting Director of Development.

We have an Airports Ad Hoc Committee, which is made up of the four Directors of the Airways Modernization Board and includes representatives from other Government agencies who have studied overall airport problems. They have proposed a program consisting of 18 projects, 94 tasks, 1 of which is a study of relative location of airports.

This work has not yet been put into force, but is an item for Board consideration at its next meeting.

Mr. MEADER. I suppose you are familiar with the studies CAA is conducting at its laboratories at Indianapolis, are you?

Major WRIGHT. Yes, sir.

Mr. MEADER. With reference to holding and approach patterns of jets?

Major WRIGHT. Yes, sir; with the CAA personnel participating in our group.

Mr. PLAPINGER. I assume that the starting point was ANDB. Is that a correct assumption?

Mr. QUESADA. That is right.

Mr. PLAPINGER. When you took over from ANDB, were there any projects that were abandoned by the Board that were under consideration by the Air Navigation Development Board?

Mr. QUESADA. Oh, I think there were. Certain were abandoned and reoriented.

Colonel FISHER. I am Colonel Fisher, Acting Technical Director.

As soon as AMB was organized, we reviewed all of the projects that ANDB had. Many of those were consolidated and various phases were dropped, but all of the projects that they had in being that were slanted toward meeting the requirement of all users that were still held to be valid were continued. Many of those were emphasized.

Mr. PLAPINGER. Do any of the projects that were dropped come to mind, Colonel Fisher?

Colonel FISHER. No, sir; I cannot think of any.

Mr. PLAPINGER. Would it be much of a job to furnish the committee with——

Colonel FISHER. No, sir; we can furnish that very easily. We will do it.

(The information is as follows:)

ANDB PROJECTS CANCELED, NOT CONTINUED, OR MODIFIED MATERIALLY BY AMB

ANDB/Army project 3.1—Study of an integration in the airframe of means of increasing the radar echo from small aircraft

Objective.—The purpose of this project was to develop an economically and aerodynamically practical method of increasing the amplitude of the radar signals reflected from small aircraft.

AMB action.—The study carried out on this project by the ANDB indicated that questionable results would be obtained using passive reflectors for radar enhancement of light planes. On this basis and due to the lack of priority and funds AMB did not continue this project.

ANDB/Army project 9.13—Study and development of instrument landing system components using radioactive materials

Objective.—The objective of this project was to investigate the usefulness of currently available radioactive materials as sources of radiation for the marker, glide scope, and localize components of the common system instrument landing system and if found feasible develop ground and airborne equipment that could be flight tested on an experimental basis.

AMB action.—It was not considered that the output from this project would have immediate application; also associated problems were sufficiently strong to discontinue this effort.

ANDB/Army project 10.2—Development of prototype voice and data air/ground and point-to-point communications systems—Ground

Objective.—The objective of this project was to begin development of prototype voice and data air/ground communications systems aimed at meeting require-

ments of common system aeronautical air/ground communications for the year 1965.

AMB action.—The ANDB/Army project 10.2 was in the planning stage at the time AMB took over this responsibility. The characteristics of the ground-air-ground data system were modified materially by AMB in order that the equipment would be compatible with the data processing and display system development AMB has undertaken. The development of an experimental automatic ground-air-ground communication system has been initiated by AMB. Effort in the point-to-point communications area awaits clarification of requirements.

ANDB/Army project 13.14—Helicopter navigation

Objective.—The objective of this project was to develop navigation facilities that are suitable for helicopter use.

AMB action.—Experimentation with a hyperbolic navigation system as planned by the ANDB technical staff was delayed by the Air Navigation Development Board. Since taking over the responsibility, the AMB has initiated experimentation to determine if hyperbolic systems are suitable for helicopter navigation.

ANDB/Air Force project 1.7—Traffic control computer development

Objective.—The objective of this project was to develop a data processor for automatic air traffic control experimentation. The data processor was to be used as a research tool in experiments to be conducted to determine the degree and type of automation necessary and what equipments and techniques are required in the integration and utilization of information from and to ground environments such as the civil ATC system, SAGE, TAC, BADGE, and TRACALS.

AMB action.—Funding for this project was not approved by ANDB. The Air Force initiated some work in this field with Air Force funds. This program was transferred to the AMB and was replaced by a much more extensive data processing and display program.

ANDB/Air Force project 14.5 and ANDB/CAA project 14.7—Research and experimentation for integration of air defense and air traffic control

Objective.—These were joint projects to carry out Air Force/CAA research and experimentation on integration of the air defense and air traffic control systems at Deer Island and to make experimentations and evaluations on ATC facilities and equipments to determine technique which may be applicable to the common system and would assist ANDB in carrying out its development program.

AMB action.—A much larger scale effort has been undertaken by the AMB.

Mr. BLATNIK. No further questions?

The hearing for this morning is adjourned. Thank you very much.

Mr. PLAPINGER. Mr. Chairman, in view of the fact originally we had a session scheduled for next Monday, it may be well to make an announcement right now that the next session of the committee will be on——

Mr. BLATNIK. On Tuesday, July 29, in the same room, 1501–B, at 10 a. m. We will have Gen. Milton Arnold, vice president in charge of operations of the Air Transport Association.

The hearing is adjourned.

(Whereupon, at 12:30 p. m., the subcommittee recessed, to reconvene at 10 a. m. Tuesday, July 29, 1958.)

FEDERAL ROLE IN AVIATION
(1958)

TUESDAY, JULY 29, 1958

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON LEGAL AND MONETARY AFFAIRS
OF THE COMMITTEE ON GOVERNMENT OPERATIONS,
Washington, D.C.

The subcommittee met, pursuant to recess, at 10:17 a. m., in room 1501, New House Office Building, Representative Martha W. Griffiths presiding.

Present: Representatives Martha W. Griffiths, George Meader, and Jack Westland.

Also present: Jerome S. Plapinger, counsel, and Elizabeth D. Heater, clerk.

Mrs. GRIFFITHS. The Legal and Monetary Affairs Subcommittee will come to order. General Arnold.

STATEMENT OF GEN. MILTON W. ARNOLD, VICE PRESIDENT, OPERATIONS AND ENGINEERING, AIR TRANSPORT ASSOCIATION, ACCOMPANIED BY CRAIG F. TIMMERMAN, DIRECTOR, AIR NAVIGATION-TRAFFIC CONTROL, AND S. B. PORITZKY, COMMUNICATIONS ENGINEER

General ARNOLD. May I bring my associates?

Mrs. GRIFFITHS. Yes, indeed; please identify them for the record.

General ARNOLD. Madam Chairman, members of the committee, I would like to introduce myself. I am Milton W. Arnold, vice president, operations and engineering, of the Air Transport Association.

On my immediate left is Mr. Craig Timmerman, director of air navigation-traffic control division of the Air Transport Association; and on his left is Mr. Poritzky, who is communications-engineer with the Air Transport Association.

Mrs. GRIFFITHS. Thank you, General. If you will begin your testimony, please.

General ARNOLD. My name is Milton W. Arnold. I am vice president, operations and engineering, for the Air Transport Association of America. Our association includes in its membership most of the United States-certificated airlines, including international, domestic, trunk, cargo, local service, Territorial, and helicopter operators.

We appreciate the opportunity to appear once again before your committee and comment on the state of aviation in the United States. Our last meeting with you was on July 2 of 1956—just over 2 years ago. Many interesting developments have transpired in this interval.

Some are most gratifying; others are still needful of serious attention.

In 1956 we were most concerned with the utilization of the airspace as a national resource. Subsequent to our testimony this problem continued to become more acute, as we had predicted. It still is causing major difficulty, both to the military and to civil operators, because of the expansion of each, and the wasteful methods employed in airspace utilization. But there are two rays of hope on the horizon.

The first is the reconstitution of the administrative methods for the airspace utilization. This spring, the CAB issued a new regulation reaffirming and clarifying the CAA Administrator's powers and responsibilities with respect to the designation of restrictions in the use of the airspace. Based on this action, the Administrator has established new administrative procedures for handling the program. It is our belief that the groundwork has now been laid effectively to permit objective analysis of airspace problems, and the determination and implementation of solutions. The new procedures are just beginning to be used. It remains to be seen whether or not actual administration of the program will measure up to the opportunity afforded.

There is another part to this very serious problem; that is, the overall evaluation of presently assigned restricted areas. It is our interpretation of the new regulation that the Civil Aeronautics Board authorizes the Administrator to rescind and reevaluate presently designated restricted areas. But it would appear, in order to be really effective, that the regulation should have directed the Administrator to reevaluate immediately the requirement for, and the use of, the present restricted areas.

We are confident that a number of those presently designated could be consolidated, some could be eliminated, and others could be relocated in the interests of a better airway structure.

A very interesting article related to this problem is highlighted by Charles Stevenson on pages 73 through 77 of the July issue of the Reader's Digest, entitled "Do the Armed Forces Need a 35-Million-Acre Empire?"

The second ray of hope for better administration of the use of the airspace of our Nation is the proposed Federal Aviation Agency bill recently adopted by the Senate and now before the House of Representatives. The joint civil-military composition of this Agency, responsible for aviation affairs of both, suggests further improved effectiveness.

A second area about which we expressed a grave concern when we were here last was the inadequate traffic-control system. We outlined in some detail the serious deficiencies which existed in the system at that time, the serious delays which accrued during instrument weather, and the lack of collision protection during good weather. We were depressed by the lack of any apparent hope that this situation would improve. But we are happy to report today that there has been some modest improvement. But of even greater importance are the prospects for the future.

During the past 2 years, a series of important events have transpired which formulate the basis for this optimism. These factors were in two different, but related, areas. The first was the increased awareness by the Congress and the administrative branch of the Government of the importance of an adequate air traffic control and navigation system to the continued success and safety of aviation—both civil and military.

This understanding manifested itself in the submission and authorization of budgetary programs geared to the existing requirements. For the first time, the CAA is operating on a level somewhat commensurate with the demands of aviation. Because of the relatively long lead times that are associated with equipments and personnel training for such programs, the benefits are just beginning to be realized. But many more months and budgets will be necessary before any substantial progress will be apparent.

The other encouraging area is the establishment of the necessary machinery to anticipate and provide for the requirements of the future. This action got underway with the establishment of the Harding Committee. This group effectively determined the magnitude of the problem and laid the groundwork for positive action. The Curtis program analyzed the characteristics of the ailment and prescribed the general course of treatment. The Airways Modernization Board was the product of this effort, and is now engaged in a vigorous program of research and development. But in this area, too, our sins of the past are all too apparent. Results from General Quesada's major programs will only begin to aid us in 1963. For several years, there will be an urgent requirement for a level of funding and vigorous prosecution of both the CAA and the AMB programs at least equal to that now in being. Any slackening of the tempo would be disastrous.

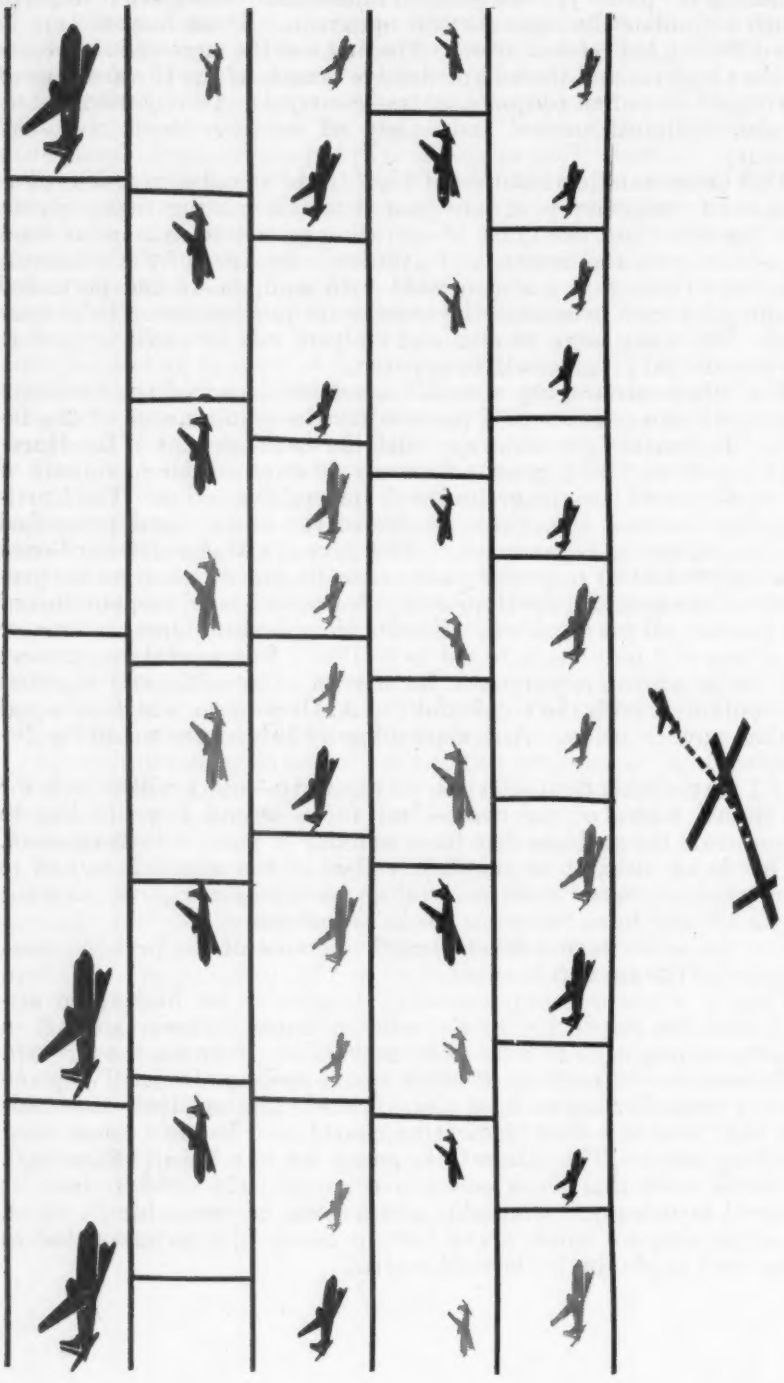
If I may at this time interject very quickly—and I will submit for the record copies of the chart—just for a second I would like to demonstrate the problem that faces us today in positive traffic control.

This is an attempt to simplify a slice of the atmosphere and to show what is termed "traffic control" or "positive separation," or what is also alluded to as "running blocks" of airspace.

You notice we have different lengths because of the problem associated with the aircraft in speed.

Time is a matter again—namely, 10 minutes for high-speed aircraft stretches out to 100 to 150 miles, whereas a slower aircraft in 10 minutes might go as little as 30 or 20 miles—between the aircraft.

Here we see the problem of blank spaces coming along. The problem the controller has as these aircraft are in motion; these move this way and these this way [indicating chart], and he must know what is taking place. This aircraft is going up into here [indicating]. He waits until this block comes over; moves the aircraft into it; moves it in this area; when this comes along he moves him in there. As a free airspace moves above him, he moves him up again, and so on up until he obtains his level of control.



This is the problem today of just 1 simplified motion here, 1 aircraft moving up. We have aircraft coming down; we have intersecting airways, the complexity of it. We cannot overload the system.

Now, if we go to positive control for all aircraft in good weather—such as out the window today, fortunately—we have numerous more aircraft flying than we do in bad weather because of the associated problems of pilot training and the other requirements.

So, the system as designed for bad weather would look like this immediately. If we attempt to go to the ground, let us say, up to infinity or 40,000 or 50,000 feet, the altitude of our maximum aircraft, we immediately see that we have already taken care of not only all the airspace, but we have attempted to put 2 and 3 aircraft in each block, which is saying that we do not have the airspace with the present system.

Mr. WESTLAND. You are only showing that on a vertical plane. There must be a lateral plane in there, too.

General ARNOLD. That is true; that would be a three-dimensional attempt. This is 10 miles wide. Then we have others out here.

But this is overly simplified. I think it gives a relative picture of the problem we have today with the aircraft, however, if the demands were attempted to be met with our present system. In other words, the 10-minute separation attempt will not take care of our present method.

This is the reason for the AMB program or the program of SAGE in attempting to go to a different system.

Continuing, one of the specific programs that is in the process of implementation is the installation of VORTAC equipment. You particularly asked us to comment on the progress being made. CAA testified a few days ago and gave rather specific indication of the status of the program. We believe that the progress is in keeping with the plans agreed to by the various interested agencies through the Air Coordinating Committee.

We have kept ourselves informed of the difficulties encountered—which always develop in connection with new types of equipment—and believe that nothing of a serious nature is indicated. In fact, we feel that the CAA is deserving of commendation for its demonstrated ability to take the transition from a low-level-establishment program to one twentyfold greater with efficiency and effectiveness.

The increasing number of VOR facilities which are being commissioned at a significant rate is making possible the establishment of additional airways which, in turn, begin to handle better the growing traffic. This progress is accompanied by the near completion of the direct pilot-to-controller communications system. Instrument-approach aids and visual aids to landing are now programed in a quantity that will begin in the near future to make a dent in the backlog of requirements.

A most important program that is just barely coming over the horizon is the provision of long-range radar for the assistance of en-route flight operations. These facilities will contribute greatly to the alleviation of our problems, but it takes time to procure and install this intricate equipment, and it takes even more time to train operational personnel effectively.

A related equipment that is also badly needed is the radar beacon system. While some of this equipment is provided for in current

budgets, the program is not progressing satisfactorily. This equipment is particularly needed for the adequate control of jet aircraft and for the amplification of all radar signals under certain weather conditions. Increased emphasis on this requirement is needed on the part of both the CAA and AMB.

We have mentioned so far those programs which are progressing rather well, although belatedly so. But a word about an additional problem is appropriate.

The events of recent months have pointed up very clearly that the forecasts of the passing of the see-and-be-seen method of aircraft separation were well conceived. On June 15, the CAA instituted the initial step of a positive-control program. The CAB simultaneously passed the necessary enabling regulations. We heartily applaud this action. It brings to reality a program that the scheduled airlines have long advocated. It is a feeble start—feeble in comparison with the total challenge ahead—but a good beginning, nevertheless.

Expansion at the highest possible rate consistent with the ability of the CAA to carry the load is of vital importance. Provision by AMB of improved methods, techniques, and equipments at the earliest practical moment is mandatory if progress is to reach a state of refinement that will catch up with the present demands and keep ahead of those of the future.

Two years ago, we requested the assistance of this committee in initiating the above program to preclude what appeared to us to be an impending disaster.

Today, we wish to express our appreciation to you for your assistance and the leadership which you provided in developing this program. We are confident that the Congress will continue to demonstate the same leadership in the future in advancing these, as well as new, programs which may be required to maintain the technological pace of aviation in the missile and space age.

That concludes our formal statement.

Mr. MEADER. Mr. Plapinger, do you have some questions?

Mr. PLAPINGER. Yes, sir.

General, on page 1, you refer in the last paragraph on the page to the CAB's Regulation CAR 60–9?

General ARNOLD. Yes.

Mr. PLAPINGER. During our hearings with the CAA, the question of the North-Central restricted area case came to our attention. That was, you may recall, restricting flights over half of Wisconsin, Michigan, Indiana, and Illinois for a period of some 7 weeks from 1 to 4 a. m.

General ARNOLD. Yes.

Mr. PLAPINGER. I questioned Mr. Pyle at the time about the recommendation that was made by the Air Space Division to him with respect to the decision in this case. The background for that was that when we had had our May hearings right after the Brunswick crash, we were told that the Air Space Division of the Air Coordinating Committee—the airspace panel would be called Air Space Division—would be used as a forum for the Administrator, but that he would make the decision under the regulation.

I wondered what the experience of ATA has been with respect to this Air Space Division. Specifically whether you consider that the Air Space Division making a recommendation is encroaching upon

the authority of the Administrator, notwithstanding that it is his responsibility to make the decision?

General ARNOLD. Well, I would like to be corrected on details.

June 1, as I recall, the procedures for implementing this new Division had not developed.

Have we had a case so far—may I ask Mr. Timmerman—which has proceeded according to the new rule?

Mr. TIMMERMAN. I am not sure we have had one.

Mr. PLAPINGER. Was this case started prior to June 1?

General ARNOLD. Oh, yes.

Mr. TIMMERMAN. The new program was effective July 1 and the method of implementation was to start at the field level and the regional subcommittees, and have them handle it after July 1 under the new procedures.

The Washington panel—it is "division" now—would handle all cases on their docket under the old procedures until they have received field recommendations under the new procedures. So it is a gradual transition.

Actually I am not sure that we have had any cases under the new procedure in Washington yet. We have had in the field.

General ARNOLD. I did not recall. That is why I particularly wanted to be corrected and clarified.

Mr. PLAPINGER. Is it your understanding, Mr. Timmerman, under the new procedures there will be no recommendation made by the Air Space Division?

Mr. TIMMERMAN. It is my understanding two things: (1) Where there is no disagreement over something and the panel members are all unanimous, it will amount to a recommendation, since everyone is in agreement.

Mr. PLAPINGER. Who is represented on that panel or division?

Are you represented, for instance?

Mr. TIMMERMAN. Yes, as an associate member. We are not a voting member, only associate.

Mr. PLAPINGER. Suppose the voting members all agree unanimously and the associate members dissent, what then?

Mr. TIMMERMAN. Well, of course, under the new system there should be no voting; I should clarify that point.

Mr. PLAPINGER. I see.

Mr. TIMMERMAN. In the past, they voted if we were opposed. If we were voted down, we lost. That is what it amounted to.

Now, under the new procedure, each agency, including the associate members, states its case and presents it to the best of its ability to defend its position. This is recorded and the Administrator is then given that information without recommendation, and it is his obligation to make a decision in the matter.

General ARNOLD. Incidentally, for whatever it may be worth, we feel that this procedure is better.

Mr. PLAPINGER. The new procedure?

Mr. TIMMERMAN. Yes.

General ARNOLD. That is right. In case-by-case analysis, it is much better and puts the responsibility upon the agency which is designated by Congress to operate the airways primarily. I think it is going to be awfully tough for any one agency, particularly on some very serious military matters, to get into that and make decisions; but

on the contrary—and this has been our recommendation—someone should head it up and have the complete responsibility.

Mr. PLAPINGER. On page 2—I assume in reference to CAR 60–9 again—you say:

In order to be really effective, the regulations should have directed the Administrator to reevaluate immediately the requirement for and the use of the present restricted areas.

Is it not your understanding that the Administrator is doing this at present?

General ARNOLD. No, sir; it is not our understanding. And I think the sad part of the whole situation is that he is authorized to rescind present ones, and he has the power to do it; but I think you are going to find the entire period of time or his whole energies and those of his staff are going to be taken up case by case. Unless there is a stronger requirement that he go in and reevaluate this huge restricted area and consolidate and attempt in the interest of national resources to solve it, then I think it will not be done.

Mr. PLAPINGER. But there is no question in your mind he has the authority to rescind?

General ARNOLD. Exactly.

Mr. PLAPINGER. Your point of contention is that he should have been directed to do it immediately?

General ARNOLD. Yes. Because we know this is the problem. I think the military and we, ourselves, all recognize there are many restricted areas and designated areas today which, I think, without going into detail are practically of no use at all.

We happen to recall many of these instances where they are so well related in the Reader's Digest in July. It goes into other problems, too.

Mr. PLAPINGER. Has ATA urged this position upon the Administrator?

General ARNOLD. It has all along.

Now the problem we face, Mr. Plapinger, is, well, we had better accept this, because maybe this was 80 to 90 percent of the problem, or 60 percent, whichever way you want to evaluate it, and not to try to get a perfect solution at this time: I would estimate it would take staff work of 8 or 10 people, with top-secret clearances and considerable judgment, to work 8 hours a day approximately, for full weeks, for a period of a year and a half, or 2 years, to get just the facts on all of these cases and to keep them current and put them under surveillance in an attempt to reevaluate. It is a terrific thing.

Mr. PLAPINGER. When you say "top-secret clearance," do I conclude correctly that this is mainly military?

General ARNOLD. Oh, yes; there is no question about it being military, or some form of secure operation.

I think we can mostly isolate atomic energy; that is equally secure.

Mr. PLAPINGER. Are there not lots of blocks of restricted areas for training purposes? Would that require top-security clearance?

General ARNOLD. It would in going into the operation and the nature of it.

Mr. PLAPINGER. I see.

General ARNOLD. Yes. That is why I feel it is necessary. If we are to do this to the best interest of the Nation, you have to have an

understanding of the reasons. You cannot just go in and add them together and come out.

Mr. MEADER. General Arnold, have the airlines made any study of the cost in terms of operations of having to avoid these restricted and warning areas?

General ARNOLD. From the best details, Congressman Meader, we have had, we selected a route which we thought was probably the most important from national defense; one of the most important from the volume, and one that is known generally to the public. I would like Mr. Timmerman to correct me on the details. As I recall, we went in in November of 1957, and January and February of 1958. We kept detailed records of the route from New York to Miami, and Washington to Miami in those months, and I believe it also includes Jacksonville and Tampa. But what we call—what is that? 1150?

Mr. TIMMERMAN. Car 1150.

General ARNOLD. Car 1150, which usually leaves the coast at Cape Hatteras and goes directly, touches just north of West Palm Beach.

That eliminates about 20 to 25 minutes' flying time. It takes an awful lot of traffic that would congest away from the inland route.

Now, that route has scheduled 90 flights a day on it. That does not include the Air Force, Navy, private flying, or contract, but those are the ones you can look in the book and find.

We attempted to determine how many of those flights were delayed. As I recall, we found that the average delay was 10 percent—or 10 percent were delayed 26 minutes every day. That is a 3-month sampling.

Again, I think that is very conservative because as I recall, Mr. Timmerman, it is awfuly difficult to determine exactly some of the delays.

Mr. Meader, for example, you are a pilot. You are sitting on the ground. It may be due to the missile firing, it may be due to some maneuvering of the Navy, it may be due to somebody else; but all you get as a pilot is "traffic control delay." You are not told anything else.

So we have had to send people into the center in Jacksonville, New York, and Washington and try to get this information. This is what we came out with on a daily basis.

Now, that, roughly—10 percent is 9 flights, 26 minutes. Nine times 26—say, roughly, half an hour each flight, so we have 4½ hours, roughly, for 9 flights.

Mr. PLAPINGER. What does this mean in terms of dollars?

General ARNOLD. As I recall, the average to the industry is $200, but most of these aircraft are better than the average because they are practically all 4-engine equipment, so you are running $350 to $400 direct operating cost.

Let's make it simple. Let's say 5 hours at $300; that is $1,500 direct operating cost on that flight. Then the indirect is 150 percent of that, so it is roughly about $4,000 on that route alone.

Mr. MEADER. And that was simply the temporary delay while missiles were being tested?

General ARNOLD. Well no, sir. We think that, from what we have indicated, the tempo has been increased; namely, probably the delay is a little more today because of the firing off of Florida.

We do not differ with the fact that the firing and the missle program is necessary; the problem is we are all in each other's way.

Mr. MEADER. Now, have you made any studies of the cost of being required to detour around a restricted area rather than to take direct flight?

General ARNOLD. Well, this would be the type that we would include here. A number of these flights were included in that, they were routed around and had to go, say, over Raleigh, N. C., and on down to Savannah, and on through that way, instead of offshore. Each one would be different depending on circumstances.

Tim, can you remember any particular ones where there were great detours—I am thinking of out West, around Salt Lake and Bagot?

Mr. TIMMERMAN. That is the biggest one.

General ARNOLD. That is the biggest one.

There is a natural rerouting of all Washington-New York traffic to some extent. Mid, we have three normal routes, and we fly some that are dog legs. The west route comes out of Allentown, and at one time, you are closer to Pittsburgh than you are Washington, are you not?

Mr. TIMMERMAN. Coming south, that is right.

General ARNOLD. You are over or around Harrisburg. You almost start flying west in order to come back into Washington. But those are the typical problems, and I have picked out some of the worst ones.

Mr. MEADER. You have not made any survey or study on a nationwide basis of the effect of restricted areas upon commercial air operations?

General ARNOLD. It is practically impossible, sir, because if this took 3 men—what would you say, about 300 hours of manwork to just run this test in New York?

Mr. TIMMERMAN. That took a lot of effort.

General ARNOLD. And you would have to go into all the records. You would have to really get a top-secret clearance to go behind the scenes to find out what really transpired in each one of these areas, or whether it was a traffic-control delay. You would have to take the reroutings, plus the delays, to get an accurate story.

We thought of it, but it would probably cost us in the neighborhood of half a million dollars or more if we did it, and then there was some question about the validity of it after we got through.

Mr. MEADER. Now, have you protested any specific restricted area and asked to have its character changed? Appealed to the Airspace Panel or the Air Coordinating Committee or CAA Administrator or the Civil Aeronautics Board, or anybody?

General ARNOLD. Oh, yes; we have protested very many of them.

Mr. MEADER. I am not speaking about new ones——

General ARNOLD. No.

Mr. MEADER. That are being placed into effect, but old ones that you have found troublesome to your operations, have you asked to have them rescinded?

General ARNOLD. Yes, sir. We have worked with Mr. Quesada on the same thing, and he has worked individually with the Defense Department. To this day we have never heard—Have you ever heard of one being turned back? I never have.

Mr. TIMMERMAN. Well, I guess there was an isolated case or two, but——

General ARNOLD. Maybe there was one.

Mr. TIMMERMAN. This is why the general asked a little while ago, or indicated our desire, for a general review of this whole problem.

Mr. PLAPINGER. Have there been any restricted areas rescinded since car 60–9?

Mr. TIMMERMAN. Not to my knowledge.

Mr. PLAPINGER. None at all?

General ARNOLD. And I think we can generally say there have been none since 1946. Maybe you could pick up 1 or 2 at the most, but no significant number.

What is the one—I should know it—just south of Washington?

Mr. TIMMERMAN. A. P. Hill?

General ARNOLD. Yes, A. P. Hill. I know that other people know the one up—what is the one north of Baltimore?

Mr. PLAPINGER. Aberdeen?

General ARNOLD. Aberdeen.

If you analyze, you do not have to have top-secret clearance; you can go down to A. P. Hill, you can drive along side of it, see this big cyclone steel fence for mile after mile, and you can go down there day after day. You will not hear any great firing or missiles jumping around. You might hear some small-arms firing occasionally in the summertime when there are a few troops down there doing maneuvers. Most of the people engage down there in fishing and picnicking. I have done the same thing.

That is an airspace right south of Washington that involves the traffic control and would make it more flexible if it were not there.

This is an Army thing. Then the Marines have a place, Quantico—I have never heard of the Army and Navy ever getting together and putting one so both could use the same area; they each have to have a separate one. This is just basic to the problem.

Mr. PLAPINGER. But you are indicating the Army has restricted airspace over A. P. Hill and that there is no reason for it; at least at Quantico presumbly there is some active training going on?

General ARNOLD. That is right.

Now, in the other places, you might find the Marines were using it a great deal for limited operations, and the Army might have a very extensive operation. I just happen to live here, and I know about the A. P. Hill.

Mr. MEADER. General, under what authority have these restricted spaces been set aside?

General ARNOLD. Tim, do you recall? Is it under the directive for responsibility of the President under the old Commerce Act in which he then delegates that to the Airspace Subcommittee?

Mr. TIMMERMAN. I know it is under Presidential directive. I hesitate to quote from memory just how this is established.

Mr. MEADER. At any rate, the bulk of the restricted areas that are now in effect were not approved by the Civil Aeronautics Administration or the Civil Aeronautics Board; am I correct in that?

General ARNOLD. They were approved by the old Airspace Subcommittee, which spoke for the Airspace Top Committee, which had representatives on it of the Cabinet members of all departments involved in aviation. And to do that, you had to have a unanimous vote.

Mr. PLAPINGER. Excuse me. If this authority is in the President, how does the CAB get the authority to delegate what its responsibility is to the CAA Administrator?

General ARNOLD. Now, Mr. Plapinger, I recall this because quite a discussion for a number of months after the famous Luke Field case.

Remember, Tim?

Mr. TIMMERMAN. Yes.

General ARNOLD. We had quite a problem on that. It was quite a case.

After that, we urged the Civil Aeronautics Board to exercise what we interpreted was its authority under the Civil Aeronautics Act. For some time there was some doubt about whether they had that.

Now, there were briefs filed by the Defense Department in the Luke Field case, in which case they contended the Board did not have the authority; whether or not the Justice Department was asked for an opinion—but again, in discussing this informally with the Board, the Board is an independent agency itself, and it could get the opinion of the Justice Department on the conflict, and still make its determination of the legal rights of the act itself, which it did.

Now, no one has taken this to court. The Board has maintained it has the authority under the act given it by Congress in 1938.

Mr. PLAPINGER. And apparently the Department of Defense has conceded that.

General ARNOLD. Well, probably technically, but not morally, I would say. But anyway, they are living with it.

And in all fairness, in backing up, I think this new provision—they did work with the Civil Aeronautics Board and agree to it, did they not?

Mr. TIMMERMAN. Yes.

General ARNOLD. So I would like to withdraw that as to the present status. So they have back this present provision.

Mr. PLAPINGER. You mean CAB's authority to promulgate CAR 60–9 has been conceded to by the Department of Defense?

General ARNOLD. Yes, that is right.

Mr. MEADER. But, of course, they have not conceded in any way that this other authority the President has used or delegated to set aside airspace has been in any way affected by this Civil Aeronautics Board regulation?

General ARNOLD. No. And I think, in all fairness, my personal opinion is that the President should retain that independently, because there are some things that should not come to the Administrator in relation to the defense of the country which would require him personally (and with recommendation, I would assume, by the Joint Chiefs of Staff) to do something outside of that.

One of those that is in existence is the Washington airspace, is it not? That is set aside by the President.

Mr. PLAPINGER. That is right.

Mr. TIMMERMAN. Prohibited area.

General ARNOLD. There are 2 or 3 in the country.

Mr. PLAPINGER. Is there any difference between a "reservation" and "restricted area"? It seems to me the Air Commerce Act of 1926 uses the term "reservation of airspace."

Mr. TIMMERMAN. This terminology has changed administratively several times. We now have "restricted areas" and "prohibited areas."

"Prohibited areas" are by Presidential directives; the "restricted areas" are through the process we have been talking about.

Mr. MEADER. Did I understand, General Arnold, that no intensive study of these restricted areas is being undertaken by anybody?

General ARNOLD. There was an attempt, and to my knowledge it was primarily done by the Air Force. The Army and Navy have never done this.

This was the background which I understood was the basis for the agreement between the Civil Aeronautics Board, the Defense Department, the CAA, and the CAB to promulgate the present regulations. The Air Force prepared a map from its commands that showed the use of various restricted airspace and those that were being used, but were not even known to other people, other than their own commands. They did a very fine cooperative program on that.

That showed up, for the first time, on one map what was transpiring from the standpoint of use of airspace by the military.

Mr. MEADER. Is that a restricted document?

General ARNOLD. I do not——

Mr. PLAPINGER. I have a copy of that. I obtained it from the CAA last year.

Mr. TIMMERMAN. I might add, General, we recently completed a study for the requirements of jet routes for airline operation in the United States. In setting up these routes, we found it necessary, in making them with optimum route structure, to violate approximately 100 restricted areas—no prohibited areas, but approximately 100 restricted areas—all of which are effective at 25,000 feet and above. We overpass some lower ones, you see, but they do not bother us because this route structure is developed for 25,000 feet and up. All of these are above 25,000 feet.

This gives some idea of the difficulty that we will have. And of course the interesting thing now will be to see what resolution of these violations of theses restricted areas will come about.

We asked for the route structure in this manner recognizing some of them will be changed by the Government. It will be interesting to see——

Mr. PLAPINGER. How many are there? How many routes are you asking for?

Mr. TIMMERMAN. Well, this is a network to cover the entire United States.

Mr. PLAPINGER. I see. I thought you were talking of transcontinental routes.

Mr. TIMMERMAN. No; there are something on the order of 12 transcontinental routes from the Canadian border to Mexico, and there are quite a number of north-south routes serving the west and east coasts, Chicago, Dallas, and so on and so forth.

This will be some indication as we progress in this program what can be done with these restricted areas that are in locations where we would need the jets to fly most efficiently.

Mr. MEADER. Is that study in any form that you could furnish a copy to our committee?

General ARNOLD. CAA has it.

Mr. TIMMERMAN. It is going to be difficult to do it. We only have one hand-developed chart at the moment.

Mr. MEADER. I see.

Mr. TIMMERMAN. Reproduction of these things is rather costly, General. I do not know, we have given it, frankly, to CAA, rather than to try to reproduce it. We gave the whole thing to CAA. However, we could certainly——

General ARNOLD. Well, to correct the record, is it not true that this is a study we made?

Mr. TIMMERMAN. Yes.

General ARNOLD. And the CAA has not made such a study; is that correct?

Mr. TIMMERMAN. They are making something of a study and we have given them our study as a basis of our request for the establishment of these routes.

General ARNOLD. Well, to answer your question, as soon as the preliminary discussions are over, we will attempt to reproduce this and furnish it for the record.

Mr. MEADER. Has anyone urged that there be an intensive review of all restricted airspace?

Have you urged, for example, that the CAA set up a team of properly cleared personnel to make this study referred to awhile ago?

General ARNOLD. Yes, sir, since 1954 we have made this available to everyone that would listen to us, to the executive branch of the Government; we have made it to Congress, to the House Interstate and Foreign Commerce Committee, to the Senate Interstate and Foreign Commerce Committee, to the Air Force, to the Civil Aeronautics Board, to the Secretary of Commerce; to the Assistant to the President, Mr. Quesada.

Mr. MEADER. And you have had no success apparently.

General ARNOLD. Well, in all fairness, yes. We think that the present rule is a step, and certainly a great improvement over the past.

There was one, I remember the case particularly. You see, this is not only a matter of restricted area, but if we wanted an airway—aviation has been growing—let's say aviation as a whole, or the military, wanted an airway between two points, this has to go for designation to the Airspace Subcommittee, the old subcommittee.

There was one going in, as I recall, to Los Angeles. The Marines had a small little firing range down around the Salt Sea. They blocked this designation of airspace for 4½ years.

I remember that we finally prevailed upon Judge Landis, who was then Chairman of the Civil Aeronautics Board, to go personally to the White House and get the thing done. Because the Navy had cast a negative vote in the unanimous procedure before the Airspace Committee, and it blocked this airway for 4 years.

Now, this is an extreme case, but any one agency can block.

What we have generally found true is that the military services back each other on their requirement, and then, quite definitely, want more and more details of why civil aviation needs another airway.

Mrs. GRIFFITHS. They are to the airspace what Russia is to the U. N.

General ARNOLD. We have had some problems, and we have worked out most of them. But the problem today is that the services are interfering with each other, we are interfering with them and they with us, with this present wasteful use of the airspace.

Mr. MEADER. It sounds to me as though this study would not cost too much money, say eight men working for a year and a half or something.

General ARNOLD. I think it has to be kept current, to, because the requirements of the atomic energy change, requirements of the Department of Commerce change; requirements of the Defense Department, our department, operations of the aircraft change. It has to be a continuous problem, plus bringing up all the backlog.

Mr. PLAPINGER. Has not CAA designated somebody specifically to take charge of airspace problems?

General ARNOLD. Yes, sir. And we think very highly of him. I think he certainly is a very capable man.

Mr. MEADER. Who is that?

Mr. TIMMERMAN. I think Mr. Noggle, Harold Noggle.

General ARNOLD. Noggle.

Mr. PLAPINGER. He is a lawyer as I recall.

General ARNOLD. Yes; he is.

Mr. PLAPINGER. How extensive is the prohibited area problem? How extensive are the prohibited areas as distinct from the restricted airspace?

Mr. TIMMERMAN. There are very few of them.

There is one over Washington that protects the White House and that area. Then there are I think only about 3 or 4 that are all associated with atomic-energy installations to the best of my knowledge.

Mr. PLAPINGER. I see.

Mr. TIMMERMAN. Oak Ridge, for instance; and New Mexico.

Mr. PLAPINGER. There is reference at the bottom of page 2 to the lack of collision protection during good weather.

My thoughts were not directed to that specific paragraph except that the reference to weather suggested some deficiencies in the weather services that were provided to commercial aviation or are to be provided to commercial aviation.

Can you tell the subcommittee something on weather service adequacy?

General ARNOLD. At the present time, I believe the Chief of the Weather Bureau, with approval of the Secretary of Commerce, is submitted a 5-year program; right?

Mr. TIMMERMAN. Yes.

General ARNOLD. This did not have the time, as I recall, for introduction as an approved document by the Appropriations Committee. It was introduced as information; is this correct?

I am not quite sure on this point either, but it is a recommended program from 1959 fiscal year through 1963.

Unfortunately the users of the airspace—namely, the Air Force, Navy, private pilots, corporate and ourselves—did not have an opportunity to review this prior to its submission. Since this time, we have had a detailed discussion of it with Dr. Reichelderfer and his staff.

Most of our questions have been answered. Our greatest concern was in the provision of 1959 request, but there was no request for high altitude operation for giving forecasts serving above 20,000 feet, particularly on the North Atlantic where the jets will go into operation this fall.

On further inquiry, it was estimated by Dr. Reichelderfer that it will require, I think, 30 positions—15 in New York center and 15

in Suitland, Md., in order to analyze the data and provide the forecast, and something like $225,000.

It is our further understanding that the House Appropriations Subcommittee—or entire committee—has now recommended additional funds to provide for this service. As I recall, it is now in conference.

The second point: We are embarking on runway visual range, which is an attempt to automatically determine the vision, or the visability, along the runway by means of instrumentation.

This is very necessary, we think, for the advent of the jet.

The technique has been proven. There were insufficient requests for this type of an instrument, called RVR.

Is that right?

Mr. TIMMERMAN. That is right.

General ARNOLD. And we believe, if we are to get ready by 1960 for the jet, that we certainly need more than 4 or 5 of these installed. I think those are the two main ones. We could go into some more details about the program.

Mr. PLAPINGER. The National Business Aircraft Association has taken the Weather Bureau to task in an article in the May 1958 issue of the magazine Skyways, and concludes that the Weather Bureau offers less aviation service today than it did 10 years ago. What has been the experience of the commercial users in this respect?

General ARNOLD. Well, now, when you say "service," I would like to know what is meant by "service," too.

Do you mean forecast or——

Mr. PLAPINGER (reading):

> During this period, there has been a loss of 85 weather stations and 279 weather-service employees.

General ARNOLD. Yes. This is the third point. I did not want to go on too long. This is a basic problem, in our estimation. We did supply the figures to Congress; I do not have them right with me.

There is a network of—is it about 600—observing stations. Each year what has happened is that the Weather Bureau cut back on the number that they are maintaining. These are hourly stations giving 3-hour reports, as well as hourly. This is a basic network for collection, and it not only serves aviation, but all other agencies.

Then what happens is, if aviation or any other group needs these, then it behooves them to continue the stations.

Now, over the past years, the result is that today the airlines are taking over a third of these hourly observations. The military are taking over approximately a third. And so we have a network of approximately 600, of which the Weather Bureau is operating approximately one-third.

I checked these figures recently, but I think this is close, within 4 or 5 percent.

Now, specifically, our recommendation is to operate the same way you have a navigation system. The Congress and the Weather Bureau should establish a minimum net which is necessary, and should not be allowed each year unilaterally to come in and chop off 10 more stations, or 15 more stations, for whatever reasons they desire, and notify you that Macon, Ga., will no longer have any weather observation. If you operate there, you have a choice of putting your people in, training them practically overnight, or else doing without the observation.

Now, this is a continuing problem that has been met every year, to my knowledge, for the last 6 or 7, in a very serious way.

Mrs. GRIFFITHS. Are there areas in the United States today where you are training your own people on weather observations?

General ARNOLD. Oh, yes. Many stations in the United States. There are many stations where we give the entire weather observation. There are many where the CAA gives it, and there are many where the Air Force and Navy, also, give it, and these stations are put on the long line in the same way those are that are supplied by the Weather Bureau.

Mrs. GRIFFITHS. Is this information available to private pilots easily or——

General ARNOLD. Yes.

Mrs. GRIFFITHS. Is it easily available to private pilots?

General ARNOLD. Oh, yes; sure.

Mrs. GRIFFITHS. Do you cover all airports where the Weather Bureau cuts off information, or not?

General ARNOLD. We have had to look at it to determine whether or not we can operate safely without it or not; generally, the answer is we cannot, and we have to supply the information. Once we do that, that is given to the Weather Bureau. It is disseminated in the same way as their stations are.

Mrs. GRIFFITHS. Now, when you make objections concerning the cut-off of the Weather Bureau, to whom do you make those objections?

General ARNOLD. Well, to Dr. Reichelderfer.

Mrs. GRIFFITHS. Is he from the Weather Bureau?

General ARNOLD. He is Chief of the Weather Bureau; yes.

Mrs. GRIFFITHS. What excuse does the Weather Bureau have for cutting off stations?

General ARNOLD. Administratively, they have to meet certain increases in pay of the personnel, and that they were directed by the Bureau of the Budget—or, that they were not given sufficient funds and they ran out, and, therefore, they now must eliminate these stations and these positions in order to continue other stations and other facilities.

Mrs. GRIFFITHS. In your judgment, is this a hazard to air safety to the users?

General ARNOLD. It has not been, because the CAA and the airlines, as well as the Air Force and Navy, Marines, and Army, in some instances, have picked up the deficiencies. But it is not one which I think is conducive to very well organized operations because, generally, this comes about by a 30-day notice. I remember the last bunch—there were 12 stations cut out, and we had about a 45-day notice.

Mr. PLAPINGER. Do I understand CAA is operating weather stations that the Weather Bureau has canceled out?

General ARNOLD. Well, most of those are supplied by what are called the INSACS stations. Those stations may be a mile, or 2 miles, from the airport, or something of that nature. Now, if the Weather Bureau said we have to cut out our facility at the airport, we can only give this to the station on top of the post office and send this in every 6 hours for the climatological survey. That does not do the man who wants to fly at the airport much good.

So, we look and find an INSACS station half a mile from there, or something, and we go over there—we, the private pilots, corporate

pilots and airlines—and ask Mr. Pyle and Mr. Thomas if they will allow the station—say at Front Royal, Va., to supply the information needed.

Mrs. GRIFFITHS. Have you ever had a suit brought against you for lack of proper information?

General ARNOLD. We do not like to think about this.

Mrs. GRIFFITHS. It is a possibility?

General ARNOLD. Yes. That is why we think the Government should be in here. It very possibly could be. I do not have to amplify to you; it could develop very simply.

Mrs. GRIFFITHS. Yes. Can you supply this committee with a list of the stations where the Weather Bureau has failed to supply the information and where you have taken over? Or tell us who has taken over?

General ARNOLD. Yes. It is no problem, because we have supplied it to another committee only a couple of months ago.

Mrs. GRIFFITHS. All right. (See appendix, exhibit 6, p. 492.) Has there been, in your judgment, any real saving to the taxpayers of the United States by the failure of the Weather Bureau, then, to supply the information?

General ARNOLD. Well, we basically get in there what we contend—namely, that these observations are more important than some of the other facilities that are being maintained by the Weather Bureau. On the other hand, this is the responsibility of the Weather Bureau, and we cannot question the administrative decisions in this case. We can only express our view.

I think, basically, the observation net is a minimum net that should be supplied by the Government; whether that should be done partially by the Defense Department and partially by the Weather Bureau, but again more basically, I think, it should be done by the Weather Bureau since that is the institution for that. That minimum net should be preserved; not be something that would be changed every day.

Mr. PLAPINGER. May I ask a question? You mentioned before that the CAA takes over via INSACS. That, I understand, is merely a communication system. There is no weather forecasting involved there?

General ARNOLD. Oh, no.

Mr. PLAPINGER. How does that take the place of the curtailed weather service?

General ARNOLD. I was speaking only of weather observation stations; not forecasting.

Mr. PLAPINGER. What is the difference between weather observation and weather forecasting?

General ARNOLD. Oh. The first is that you must get your network of observations and prepare your synoptic map from the observations, which include winds aloft, the temperature, dew point, visibility, the cloud cover; all of that is plotted and assembled at each spot, some 500 or 600 stations in the United States.

Mr. PLAPINGER. Who does that assembling? Does that require a meteorologist, or can any qualified pilot——

General ARNOLD. No; it requires a meteorologist to plot this and analyze it, draw the map, and make the forecast from it.

Mr. PLAPINGER. Right.

Mrs. GRIFFITHS. Do you have some people who are competent to make a forecast?

General ARNOLD. Yes. We have a number of airlines that have their own meteorology department.

Mr. PLAPINGER. I am still not clear on how INSACS takes over on this weather service.

General ARNOLD. Only in the observation.

Mr. PLAPINGER. You say that requires a qualified meteorologist?

General ARNOLD. No, sir. It requires a qualified observer. I have trained many. You can train an observer in 15 to 20 days.

Mr. PLAPINGER. I see.

General ARNOLD. How to take the dew point. How to cover the clouds. How to report it. How to put it on the teletype.

Mr. PLAPINGER. I see.

General ARNOLD. He is not a trained meteorologist for analyzing the maps; he is taking a daily observation.

There are first-order, second-order, and, I think, third-order stations. Then there is what is called cooperative.

In the old days in flying, when you were about to take off, you would get on the telephone, call 100 miles down, and there was a friend down there; you would ask him to go out in the cornfield and take a look and tell which way the wind was blowing. That is what started the whole thing.

Mr. PLAPINGER. I see. You mentioned a 5-year program. This calls to mind your characterizing of the airways modernization plan when you last appeared before us as patchwork. What do you feel today? What is your feeling today about the airways modernization plan?

General ARNOLD. Well, it is so easy to be critical, but, in an attempt to be critical, we feel that the progress that has been done and maintained here by the Government, both Congess and the executive branch, in the creation and administration of the Airways Modernization Board, it deserves great commendation.

Their program is specific, and their ability to organize themselves and to move, I think, is almost astounding in comparison to past conditions. We believe that their approach is basically sound. They are concerned not only with the solution, but the economic solution, and the safe solution. We think they have competent people, and I think the method by which they are approaching the program and solution is very sound.

Mr. PLAPINGER. You refer to the need for a radar beacon system in your statement and, also, say that the program for furnishing these beacons is not progressing satisfactorily. Is that because there are not sufficient numbers budgeted?

General ARNOLD. Yes.

Mr. PLAPINGER. What is the reason for this statement?

General ARNOLD. This goes back—maybe you could simplify it, because I am afraid I might get it too involved here. Mr. Poritzky could simplify this program.

Mr. PORITZKY. Well, this is, basically, a program providing radar reinforcement in bad weather and a certain degree of identification of aircraft. I think the reference here is to the fact that the programs—there has been money budgeted for some 18 stations in addition to a 9-station in-service test program. A series of procurement delays,

both from the engineering and administrative side, have delayed the programs.

For the 18 facilities for which money was made available in fiscal 1957, the orders have now been placed; the delivery will be some time hence, probably within a year; perhaps a little bit more. There have been a large number of administrative delays and manufacture delays in the procurement.

Mr. PLAPINGER. I see.

Mr. PORITZKY. Even of the early facilities.

Mr. PLAPINGER. To what do you attribute the administrative delays?

Mr. PORITZKY. This program was administered in the beginning by the Air Navigation Development Board. The in-service test program, nine facilities, is still administered by the Airways Modernization Board.

The physical structure, the structure for obtaining of money from various agencies which existed under the Air Navigation Development Board, caused a number of delays. There was one little piece of money from the CAA, another little piece of money from the Air Force, and the third piece of money from the Navy. The attempt by the Air Navigation Development Board at the time was to tack a few extra antennas, for example, to existing contracts.

This kind of program almost naturally engenders delays, and I think this particular program has suffered more than its normal share.

Mrs. GRIFFITHS. Yes.

Mr. MEADER. Madam Chairman.

Mrs. GRIFFITHS. Mr. Meader.

Mr. MEADER. General Arnold, I failed to notice anything in your statement about airports. I wanted to call your attention to a little notoriety our committee gave you in our report, filed July 27, 1956. We quoted you on page 7 as saying this:

> Milton Arnold, vice president in charge of operations and engineering for the Air Transport Association, characterized airport planning as "the most backward phase of aviation." They—CAA—have gone along with the way the wind is blowing, and I do not think they have done any concerted development in airports. I think it is a factual statement that the airports today are further behind in relationship—in other words, our feeling, Mr. Chairman, is the airplanes are ahead of the air-traffic-control system and the facilities in the air channel, yet the air-traffic-control system is by far ahead of our airports. So, the weakest link in this in capacity and operation is the airport.

We asked Mr. Pyle some questions about the study of the holding and approach patterns of jets as related to airport design. During the hearings on July 22, 1958, it developed Mr. Morris said that a study was being run, a simulation program at Indianapolis, concerning holding and approach patterns for airports in the Detroit area, which apparently was just started there the 14th of July of this year and was expected to be concluded on August 8.

I believe the commencement of that study was after the CAA had been notified that we want them to appear at our hearings. Anyhow, it was very recently inaugurated.

Now, I just wish you would tell us what progress has been made in the 2 years since you were so critical of the CAA's management of airport planning.

General ARNOLD. Well, I think considerable improvement has been effected, Congressman Meader.

I think today that if the fleet of jets—300—were placed upon us. that statement would still be valid: that the airports are further behind than is navigation and traffic control.

I do not believe, though, that by 1960, with the present program that Congress has started and the Air Modernization Board has started, and very belatedly the CAA—but I have no criticism of the program that they have recently started—it will meet the challenge.

There will be a number of instances which I can get into on, I think, passenger handling and others, that will not be what we would like. But I think operationally, the first is that today the Air Modernization Board with the work of a number of airlines—and particularly Mr. Burnard's group, the Airport Operators Council—have done some very basic research and development on taxiways, high-speed turnoffs, and so on. This has been in cooperation, I believe, with Stanford. The Air Modernization Board has accepted that as a specific project. They have obtained a KC–135, high speed, for turnoff. In other words, to design and say whether a high-speed turnoff should be a radius of 45°, or whether it should be a 2,000-foot circle, or what. Also on lighting and other such projects.

I think Mr. Burnard can go into more detail as to the present status of his feeling on that particular side of it.

On the jet letdowns, we were very impressed. It was quite a healthy change with the Indianapolis study of an attempt to analyze how we are going to handle the job—whether we are going to feed them off from 20,000-foot stacks or 10,000, and we think they have made very appropriate studies in determining safety and flexibility, and the total volume.

Now we have attempted to go around with them and to give this discussion—which takes about an hour and a half, or 2 hours, on this, and it is very basic—to various people on the west coast and east coast. And I believe Stan also finished that tour about 2 or 3 weeks ago, did he not?

Mr. TIMMERMAN. Yes, sir.

General ARNOLD. So this, I think, has all been done in 2 years.

When Congress has seen fit to appropriate considerably more money, then I think the individual cities have seen fit to move in and establish programs, and master plans to meet the jet age in the operations. (See appendix, exhibit 6, p. 492.)

There is, I believe, a great deal to be done yet in the handling of passengers, the noise problem, how we are going to load, take care of 300 passengers versus 60 passengers, and how we are going to handle the baggage.

United Air Lines, American, and, to be specific, Braniff and Eastern, and all, have individually been working on this.

Now, that has been worked at a local level applying, say, to San Francisco. It may have to be changed. Then work will have to be done with New York in the same way to find out how it can be done there.

I believe, very quickly, that is our estimate of the present situation of airports.

I do not know whether that is specific enough or not, Mr. Meader.

Mr. MEADER. Well, in other words, you think satisfactory progress has been made in the last 2 years in improving the situation with respect to airports that you criticized 2 years ago?

General ARNOLD. I think a great deal. I think it is much like—if I may comment—the VORTAC program about which we were talking.

If you add up the numbers today, you will find the numbers in another year will be four times that many. However, a great many of the difficulties have been solved in this past year.

I think this is true in the program of airports. A great deal of the problems regarding the length of the runways, the problem of cities and combinations, and other such agreements with the airlines, have transpired. I think in another 2 years you are going to see most of the situation solved from an operating standpoint.

I do not think you are going to see over 15 or 20 big cities by 1961 that will have adequate facilities for the proper solving, let's say, of the noise problem and handling passengers in volume, the baggage problem, and their comfort. Because I think that will be a little slower, sir.

Mr. MEADER. As you may know, General, I was quite interested in the problem of separation of airports in a terminal complex.

Mr. Pyle indicated that it was not possible for the Civil Aeronautics Administration to come up with any general conclusion about desirability of distance between major airports.

Do you have any comment on that matter?

I mean it looks like we are running into a situation where we are going to have more than one airport serve a major metropolitan area. Does the ATA have any views on how far apart from each other those airports should be?

General ARNOLD. Yes, sir. I think I have rather specific views. I think like any rule, it has got to be somewhat flexible, but I think a general rule is a minimum of 12 to 15 miles. And there is also the variation of that.

I can imagine 2 airports that would need to be 18 or 20 miles apart; and 2 that you could possibly get away with 8 to 10 miles through efficient normal flow—because that was the direction of the traffic moving in those areas.

Now, I will admit we have them today which are less than 3 miles apart, and they are not conducive to simultaneous operation or very efficient use.

I will just pick out one; one of the most glaring examples is Floyd Bennett in Iowa. I think that is 1¼ miles; is it not?

Then there is a place in New Iberia, La., which was a classic one, less than 6 miles. We fought the case, we fought it—but still they felt that any other place would be very marshy and very difficult, and the military finally settled on putting in a military installation 6 miles from the present commercial field in New Iberia.

I cannot sit here and tell you that 11.9 miles, or 12.5 miles, would be bad and the other one would be good—namely, 13 miles is good, and 12.5 is bad—but I can say I do not think it is proper to put one 6 miles from another. And I think the general rule is 12 to 15 miles.

Mr. MEADER. The thing that impressed me was Congress is now being asked to extend this airport program and expand it. The way we passed the law 3 or 4 years ago, we practically took Congress out of any participation in the airport program after we passed the bill. We did not even have the power to deny appropriations for it.

It strikes me that before we go into a huge, costly program someone ought to have done some planning and ought to have some criteria

or standards set up, so we do not pour money out wastefully simply perpetuating mistakes that have been made in the past years.

Of course, I specifically have in mind these two airports in the Detroit area.

General ARNOLD. Yes.

Mr. MEADER. I understand the people from what is now called the Detroit Metropolitan Wayne County Airport were down here testifyinig before the House Interstate and Foreign Commerce Committee, and said they would need 30 to 35 million dollars more for that airport. I think they said they had put in $20 million in the past 2 years.

General ARNOLD. Yes.

Mr. MEADER. I know they put in a lot before that.

Well, before we go ahead and build these airports, one on top of another, do you not think CAA ought to make some kind of study—set up some standards and criteria?

They say you cannot do it; you have to take each case on its own facts. But it seem to me they ought to be able to come up with some general standards, and it seems to me—you almost said that you agree with me—that they can come up with some general standards.

General ARNOLD. Yes, sir; I do. And I agree they can do a better job on just what you are talking about.

Now, specifically, the Air Modernization Board has assumed a responsibility in this field of a major divisional project; namely, air navigation and landing aids, traffic-control system, and airports, also It is attempting to do just this.

Now, in the meantime, I think your next——

Mr. MEADER. Now, just a moment. Mr. Quesada was up here the other day. I asked them about this. They had a lot of projects, but they did not have anything to do with spacing of airports.

General ARNOLD. I think that is a fair statement. I stand corrected.

Your point is that it is not a complete program in itself; there are many facets of it that are being developed by Quesada. I think that is correct.

Mr. MEADER. Well, I think the responsibility is on the Civil Aeronautics Administration to look ahead a few years and make the best studies they can of traffic to be anticipated, and the spending of Federal moneys for airport development. They ought to have some kind of plan and some kind of criteria.

General ARNOLD. I think this is correct, sir. And I think that the responsibility is there legally.

Mr. MEADER. Do you know of any progress that CAA has made in this particular area, airport planning and national airport program, in the last 2 years?

General ARNOLD. Not——

Mr. MEADER. Or have they been just coasting along like they were before?

General ARNOLD. Generally I think there has been an improvement, but not to the point I believe you are addressing yourself today.

If I may ask Mr. Timmerman, I remember we attempted to find out the source for any establishment of distance between airports.

Do you recall where we found this 12 to 15 miles? Was it in a specific case?

It was in a specific piece of paper of the CAA, wasn't it? Or was it in their Airport Manual?

Mr. TIMMERMAN. Well, there has never been actually created a figure to apply. There have been a number suggested.

The Navigation Panel of the Air Coordinating Committee included this as a part of the study that was made, but the separation of airports was left pretty vague, I think, in many respects, sir.

Mr. MEADER. I think I know what General Arnold is referring to, the ATA did supply us with excerpts of the minutes of a meeting in which the Civil Aeronautics Administration member made a statement about separation of airports.

General ARNOLD. I think that is right.

Mr. MEADER. The only thing of an official character that I have been able to find is the manual that was gotten out in 1949. That I do not see, I cannot lay my hands on the reference right now. I thought I had it but I do not seem to have it.

General ARNOLD. Is that the single runway promulgation started by Runsol? Is that the one to which you are referring?

Mr. MEADER. It said that airports should be separated according to the radii of their holding patterns.

General ARNOLD. I do not recall that one, sir.

Mr. MEADER. But apparently the Civil Aeronautics Administration in 1949, in a manual called The Airport Design, was at least able to state that much of a criteria for the separation of airports; but I have not been able to find anything official that the Civil Aeronautics Administration has published since 1949—almost 10 years ago, long before anybody thought about using jets commercially. I cannot see that they have done an awful lot in studying the problem. They are now getting around to making this study of holding and approach patterns of jets which Mr. Lowen testified they were going to do 2 years ago.

General ARNOLD. Well, I think in all fairness there has been about a year's or a year and a half's work put in it. This man has done it. He deserves a lot of credit for it, this man at Indianapolis.

But again, I do not think that goes to the point you make, which is whether it is 10,000 or 8,000 feet. If the airports are not located in the proximity of each other, then it is a figment of imagination, because you cannot get down on the concrete.

I think this is the basic problem to which you are directing yourself, which, I think, deserves more attention.

Mrs. GRIFFITHS. Mr. Plapinger.

Mr. PLAPINGER. Yes.

AIR TRANSPORT ASSOCIATION OF AMERICA,
Washington, D. C., July 15, 1958.

UNITED STATES AIRLINES STATE VIEWS ON SHORT DISTANCE AIDS

The airlines, as a result of recent discussions of the Airline Operations Conference, have stated their current views on short distance aids requirements in the air traffic control system, Milton W. Arnold, vice president, operations and engineering division of the Air Transport Association, announced today.

The airline statement responds to the program of the Civil Aeronautics Administration "which is aimed at the development of a complete air traffic control system concept based on the accuracy and continuous position fixing capabilities inherent in the VORTAC system." The accuracy of position fixing required to implement the CAA's program is stated in Air Coordinating Committee

Paper 58/11 (Revised), dated September 6, 1957. The program provides for a system of VORTAC airways with a basic route system of 9 statute mile wide airways up to 15,000 feet, an intermediate route system of 14 statute mile wide airways up to 30,000 feet, and a high altitude route system of 30 statute mile wide airways up to 75,000 feet in altitude, based on VORTAC ground facility spacings of 90, 180, and 360 statute miles respectively.

The airlines are primarily interested in the expansion and continued implementation of VOR worldwide. The VOR system can and does now provide, in many parts of the world, adequate track guidance for air traffic control. The addition of DMET may be logical where traffic densitites or other considerations dictate position fixing accuracies such as those outlined by the Air Coordinating Committee. Regardless of the merits of other position fixing systems, the economic impact of worldwide VOR implementation makes the continued use and expansion of VOR of vital importance to the airlines.

The specific statement of airline views is as follows:

STATEMENT OF AIRLINE VIEWS ON THE SHORT DISTANCE AID PROBLEM

1. The airlines agree that the criteria for route widths and facility spacings, implicit in ACC Paper 58/11 (Revised), are realistic and that the requirement for improved position fixing within and along airways is required in the dense traffic situation expected to exist in the United States in the coming years.

2. The airlines agree that the requirements for accuracy implicit in ACC Paper 58/11 (Revised) in order to stay within the assigned airways and provide good accuracy longitudinally along the airways, can be technically accomplished by 1965. Further demonstration is needed of the operational practicability of the stated accuracies.

3. The airlines feel that distance measuring capability will be required to meet the route width and facility spacing criteria established by ACC 58/11 (Revised).

4. The airlines feel that the requirements for improved navigational capability for aircraft operations as well as ATC purposes can be met most appropriately by the use of distance measuring equipment. Analysis of various ways of meeting the accuracy requirements of ACC 58/11 (Revised) has indicated that other systems of short distance aids can also be used to meet the stated accuracy requirements.

5. Many airlines feel that DMET will be desired and a few feel that it will be required for the efficient and economic operation of aircraft. Two airlines have already undertaken or intend to undertake the procurement and installation of airborne DMET in substantial numbers of new jet and turboprop aircraft. Many airlines have space and wiring provisions in their new jet and turboprop aircraft for the installation of DMET equipment. One airline has indicated its intention to install DMET in its entire fleet, both jet and piston engine powered aircraft.

6. The very high cost of the VORTAC program results, to a large extent, from the cost of TACAN. The cost of a single TACAN facility is more than six times that of an original common system DME facility. The cost of the distance element of a TACAN-combined azimuth-and-distance facility is far greater than if the inherently simpler TACAN–distance-only were provided. The airlines have no interest in the TACAN azimuth service.

The civil users should not be asked through imposition of user charges, if applied, to underwrite the TACAN portion of VORTAC. Civil user charge consideration should include only that portion of rho-theta costs that would have accrued if the common system VOR and DME had been completed.

7. Whether or not the airlines endorse the use of DMET, as would be evidenced by wide-scale implementation, such a decision will be preceded by a reasonable service test period in order to (*a*) evaluate the operational worth of DMET and (*b*) to provide mutual assistance to the CAA in exploring the practical accuracies of the DMET facility as applied to the intended system application.

8. The airlines agree that, based on their current knowledge of DMET, it should be proposed for inclusion in ICAO annex X as a standard but that implementation should be on a permissive basis. Thus the air carriers at this time support the United States efforts to press for inclusion of DMET technical characteristics as a part of ICAO annex X.

9. The airlines are primarily interested in the expansion and continued worldwide implementation of VOR. The VOR system, by itself, can and does now provide (in many parts of the world) adequate track guidance for ATC.

The addition of DMET may be logical where traffic densities or other considerations dicate position-fixing requirements such as those outlined in ACC Paper 58/11 (Revised). Regardless of the international fate of DMET, the airlines feel that the VOR system requires primary protection, encouragement, and expansion. Regardless of the merits of other position-fixing systems which might be proposed, the worldwide implementation of VOR ground facilities and the economic impact of wide-scale implementation of airborne VOR within the United States and elsewhere, both in scheduled air carriers and general aviation aircraft, makes the continued use and expansion of the VOR system of vital importance to the airlines.

10. The airlines are gravely concerned about the economic impact upon them of the existence of more than one facility in the same geographical location, which performs essentially the same function. Therefore the airlines can support for inclusion in annex X of ICAO only one short-distance navigation system.

Mr. PLAPINGER. General, in the release of the Air Transport Association, dated July 15, entitled "United States Airlines State Views on Short Distance Aids"——

General ARNOLD. Yes.

Mr. PLAPINGER. Item 5 says:

Many airlines feel that DMET will be desired and a few feel it will be required for the efficient and economic operation of aircraft.

In the VORTAC Committee report of December 27, 1954, it was stated:

Jet aircraft have an urgent requirement for VORTAC navigation capability because of their speeds.

I believe when you appeared before us 2 years ago, you furnished the committee with a letter from ATA to Mr. Quarles and Mr. Rothschild, February 15, 1956, in which you said that—

airline jet aircraft will be in operation during 1959, and the provision of distance measuring capability for these aircraft is desirable if not mandatory.

Does this item 5 indicate a change in the views of the Air Transport Association since this earlier correspondence?

General ARNOLD. I do not think so; but if I may, could I try to explain some what has transpired in that time?

Mr. PLAPINGER. Surely.

General ARNOLD. First, I stated, as you quoted in my letter, we said provisions were being made, and that is correct. All purchases of jet aircraft, including the American-constructed turboprop—and I withhold that as not applying to the F–27 because I am not positive, but the Electra specifically—have provided for the wiring of distance instruments in the aircraft. This includes the 707, the DC–8, and so forth.

Now, at the time that this was done, it was felt—and I recall that Eastern, Pan American, and I believe TWA, and maybe one other carrier—were of the opinion in 1954–55 that from their analysis of the British operation, it was an economic requirement for fuel conservation in point-to-point flying and letdown.

Since that time, in a more thorough examination of the British operation, it has been found that that is not 100 percent correct, that a great deal of the distance capabilities required by the British in their common operation was due to the lack of navigation facilities and not from an economic fuel flow problem. In fact, on these flights over to Australia and over to India, they did not have any other capability except the distance. They had no heading on the problem.

Mr. PLAPINGER. Are you saying because we have VOR that the distance measuring requirement is not critical?

General ARNOLD. It is not as great. But as stated here, some of the carriers feel that—particularly for the jet operation—it is a requirement, and have so stated.

Now, here we are dealing with something that we are trying to evaluate the best way we can without having the experience, and we attempted here——

Mr. PLAPINGER. You mean having the experience with the specific piece of equipment?

General ARNOLD. That is right.

Mr. PLAPINGER. The distance-measuring part?

General ARNOLD. I meant the jet aircraft.

Mr. PLAPINGER. Well, the military certainly had the experience.

General ARNOLD. But if that is true, then we do not need it. They have been flying them, so I do not think that concludes it, because they do not have distance measuring.

Now, they contended they have, but they have not had it in operation for any length of time to have any experience, except on specific tests, like in Alaska and on maneuvers.

Mrs. GRIFFITHS. You are saying the military did not have TACAN, is that right, in operation?

General ARNOLD. That they do not?

Mrs. GRIFFITHS. Yes.

General ARNOLD. That is what I am saying today; that is right. They are not depending upon TACAN as their basic operation in the United States to the extent of NATO, West Germany. I think they are using it there in a greater extent. But I do not think that is classified as to the number of stations, but certainly there are more TACAN stations than there are VOR's in the NATO nations.

Mr. PLAPINGER. Talking about distance measuring, DME was in being, not DME/TACAN. I think you said it was reliable at the time, and it would be a great contribution to safety or would contribute to safety.

Why did not the airlines install DME equipment?

General ARNOLD. This goes back to the original test that we conducted, accomplished by Mohawk. American and United installed how many DME's on the Chicago-New York runs? Do you recall?

Mr. TIMMERMAN. Five or six.

General ARNOLD. Five or six. And the analysis of that operation was to the effect that the distance-measuring equipment would not give any additive flexibility to the traffic-control system.

Mr. PLAPINGER. When were these tests made, sir?

General ARNOLD. When was it? Do you remember the dates, Mr. Timmerman?

Mr. TIMMERMAN. I am sorry, I did not hear.

Mr. PLAPINGER. The American and the Mohawk tests.

General ARNOLD. When were the tests?

Mr. TIMMERMAN. About 1952 they started.

General ARNOLD. And they were continued for about a period of 18 months to 2 years; is that right?

Mr. TIMMERMAN. That is right.

General ARNOLD. Would you want to elaborate more on this, Mr. Poritzky?

Mr. PORITZKY. Well, I think there were several separate tests in the general test that the general just mentioned.

The CAA made available to 6 air carriers, I believe 1 each, airborne equipment of an early variety of the old-style DME. Subsequently the CAA, with participation of the Air Navigation Development Board, made available to Mohawk Airlines a group of, I think, six equipments with which an evaluation was conducted. I think that was generally it.

The CAA equipments were made available to the airlines roughly in 1952–53, this general area. The Mohawk tests were initiated at that time, but ran somewhat longer, perhaps until 1954 or so.

Mrs. GRIFFITHS. And who said it would not add to the flexibility, the airlines or CAA or CAB, or who? Who made the decision?

General ARNOLD. It was primarily the airlines and the Air Transport Association's analysis of these operations; we determined that it would not increase the flexibility of our present system to the point of insisting upon it as a requirement.

Mrs. GRIFFITHS. Now, was that under circumstances where you did not have very much traffic in the air? Did that contemplate increased traffic? Were you really saying, with increased air traffic, it is not going to be necessary; it would add nothing; or were you saying, under today's situation—that is, when you made it—that it was not necessary?

General ARNOLD. We were thinking primarily of the distance as applicable to the piston-driven aircraft in that particular instance. Also, I believe, in all fairness, we were attempting to evaluate and anticipate an expanded increase of operation. The areas in which these tests were conducted were the high-density areas, such as the Chicago-New York Mohawk route.

The problem at that time was whether distance measuring would give you innumerable holding positions and increase your ability of flow into traffic pattern. I think this was the basic problem here, because the airlines have always insisted that navigation, per se, with our present system of cross checks and headings, is not a problem.

Now, no one differs or disagrees with the fact that the equipment would be an added nicety, or an added advantage, to the comfort of the pilot to see that he is not 2 miles away from the station, but that he is 1.8 miles from the station, but——

Mr. PLAPINGER. Also with relation to other pilots in the area or other planes.

General ARNOLD. Now we are getting into the basic problem here of traffic control, and this is the basic difficulty of the other pilots. The present traffic-control system is one in which we determine that the traffic controller has the overall view of the traffic moving. Now, if we attempt to determine that each pilot is going to have his own holding fix, now, let's just take New York alone, we have—what?—50 holding fixes in that area?

Mr. TIMMERMAN. Approximately that.

General ARNOLD. That are established. Those are known, physically.

If we attempt to go to this 150 to 300, then the communications load is going to be so terrific it is not going to be 50 percent more or 3

times as much; it is going to be 10 times as much, because you have got to have the information back from the pilot to say, "I am now 1.6 miles from Coney Island." The next guy says, "I am 1.8 miles." Then you have to tell each how far they are from each other.

The compounding problems of communications in this field are terrific. This is why in evaluating it from a traffic-control-in-a-high-density-area viewpoint, we feel that it falls short of doing the job. It moves in another direction; namely, individual control instead of a central control.

Mr. PLAPINGER. You are talking of self-contained units rather than——

General ARNOLD. No.

Mr. PLAPINGER. What you are saying, really, is, because of the deficiencies in the CAA system, that the airlines were reluctant to put distance-measuring equipment in? Is that correct? You are overloading the communications system; you are referring to the system operated by the CAA?

General ARNOLD. That is true, Mr. Plapinger, but, in all fairness to the CAA, the system was never designed for what it is being used today.

Mr. PLAPINGER. Which system was never so designed?

General ARNOLD. The thing we are using today. The traffic-control system was designed as a navigation system. Mr. Timmerman can probably elaborate on it, because I think the story is a little bit interesting. The traffic-control system, as such, was invented by the airlines. You can tell it, if you may, as to how this traffic control ever started.

Mr. TIMMERMAN. Well, of course, the traffic-control system was designed initially as a system to operate only in bad weather, when pilots could not see. As we all know, the increase in speed in individual aircraft and increase in volume of total aircraft have changed all of this to where we need separation in good weather as well as bad. It is manifold greater than it was designed to handle. This is one of the problems we are trying to find a way out of.

On the DME, we have never convinced ourselves the DME alone or the DME as an addition to the traffic-control system would make a major contribution to the system's improvement. We recognize readily it would be nice to have, but this equipment costs considerable money airborne.

Mr. PLAPINGER. How much would this DME cost?

Mr. TIMMERMAN. Airborne equipment is $5,000. We normally carry 2; that would be $10,000 per airplane. We have never brought ourselves to the conviction we would profit from this. Rather, we think we would profit more from the installation of beacons. I am speaking now of the past, not the present. We felt we would be better off spending that much money for beacons.

Mr. PLAPINGER. You do not spend the money for beacons; this would be the Government spending money for beacons.

Mr. TIMMERMAN. Both. We would spend it.

Mr. PLAPINGER. In your aircraft, I see. I thought you were referring to the radar beacon system.

Mr. TIMMERMAN. There is a ground interpreter, but the beacon itself is in the airplane.

Mr. PLAPINGER. I see.

Mr. TIMMERMAN. This is a unit cost of similar amount. Nevertheless, in spite of that, as indicated in our position which you have there, some airlines have said that they feel this is a requirement for their operation and they are going to buy it for their entire fleet. Others have said they think it is desirable and they are going to buy it for certain portions of their fleet.

Mr. PLAPINGER. Why is it only a few airlines feel DME will be required?

Mr. TIMMERMAN. I guess because this is a democracy.

Mrs. GRIFFITHS. As a matter of fact, this sort of thing that you have set up here on the board is a rough way of trying to measure distance, is it not?

General ARNOLD. Yes; it is. And it is a very inefficient way.

Mrs. GRIFFITHS. Yes, because, as a matter of fact, you put those planes in an area on the theory of their power to move, the rate of speed at which they will move. You do not know they will move at that rate of speed. One may move 20 miles an hour more slowly and another 50 miles an hour faster.

General ARNOLD. Exactly.

Mrs. GRIFFITHS. So distance-measuring equipment actually would make this thing operate with more exactitude, would it not?

General ARNOLD. No; this is where I am afraid——

Mrs. GRIFFITHS. Now, what you are really saying is your difficulty would be in communications. You cannot bring it in and send it back, and so on. That would be a real problem. But, if you could master that, then you can make your chart work better, can you not?

General ARNOLD. Yes. Now, that step that you have just mentioned is in the new program of traffic control that Quesada is attempting to solve, what we call off-the-shelf types of equipment. It is a type of distance measuring, but it is automatic. For example, we will install in most of the aircraft an automatic, what we call data link. So, automatically, on the ground system is being transmitted the position of the aircraft, both altitude and constantly correcting its speed.

Mrs. GRIFFITHS. Then how do you get it back to the rest of these people?

General ARNOLD. Then this is put in a computer.

Mrs. GRIFFITHS. Yes.

General ARNOLD. The computer controls all the aircraft.

Mrs. GRIFFITHS. Yes.

General ARNOLD. I do not care about this aircraft here, because the man here who is controlling me is figuring it out in the computer and automatically giving me the signal if I violate the minimum spacing, or the violation of crossing.

Mrs. GRIFFITHS. What would a speed law of those aircraft be in each category?

General ARNOLD. The speed we would need, and it is why the computer can do it—we are getting up into supersonic with the military, so we are talking about 2,000 miles an hour.

I think a proper question to Mr. Quesada might be in regard to missiles. I think one of these days we are going to have to file flight plans on missiles. I think your committee and others are going to be the first ones if we have, unfortunately, a little trouble with a mis-

sile and airplane. It is going to happen. We would rather not invent problems, but the risk is there.

Mr. PLAPINGER. There has been an instance where a rocket was fired across an airway already, has there not?

General ARNOLD. I imagine there has been, but I mean in addition to that, if we have a collision between them.

Mrs. GRIFFITHS. Now I would like to ask you, when some of these rules are changed by the CAB, do you appear before them?

General ARNOLD. The Administrative Procedure Act provides, except when they determine it is an emergency, which they very seldom do, that it is put in the Federal Register and we are then allowed 30 days to comment on the regulation in detail.

Generally those are handled through our office as a centralized group for the airline, the same way as the private pilots and military can make comments, or ignore it as they see fit.

Mrs. GRIFFITHS. Do you sometimes take a position in relation to the change of a rule before such a rule is put in the Federal Register? Do you ask for the change in rule?

General ARNOLD. Oh, yes, many times. Yes.

Mrs. GRIFFITHS. Have you expressed yourself on DME to the CAB?

General ARNOLD. Oh, yes. We have expressed ourselves so many times on this problem that I do not mean to be facetious but——

Mrs. GRIFFITHS. Have you opposed or supported it?

General ARNOLD. In regard to a regulation, I do not believe one has ever been promulgated as a requirement, has it?

Mr. TIMMERMAN. No.

General ARNOLD. So specifically, the problem in general, about the requirement of putting it in, as we have discussed. Our paper to the ACC went to the CAB, as well as the CAA. But the Civil Aeronautics Board, as such, has never promulgated a draft release requiring civil DME, or say, DMET.

Mrs. GRIFFITHS. And did you oppose there being any?

General ARNOLD. I do not think the problem—they have never required it to my knowledge.

Mrs. GRIFFITHS. Well, did you ever oppose it before they made any such suggestion?

General ARNOLD. Well, we definitely opposed it in writing to the airlines and recommended they not buy it.

When was it, 1954?

Mr. TIMMERMAN. 1953 or 1954.

General ARNOLD. In 1953 or 1954. Because of the controversy—which unfortunately did result on that—the difficulty between TACAN and civil DME. And until that was settled, we recommended strongly to the airlines that they not buy the equipment, because we knew that the two could not exist.

Mrs. GRIFFITHS. In the past year, have you suggested improvements in rules of CAB or opposed new rules?

General ARNOLD. Yes.

Mrs. GRIFFITHS. Could you give me some examples of those you have supported or opposed?

General ARNOLD. The promulgation of the high-altitude route, which was promulgated, issued a draft, and became effective—what?—June 15?

Mr. TIMMERMAN. Yes; positive control.

General ARNOLD. We supported that and recommended that it should be developed as a rule.

I am trying to recall, there was a specific one that we urged shortly after the collision at the Grand Canyon. I remember that the Interstate and Foreign Commerce Committee representative and ourselves, as well as others, met with Mr. Durfee, and we recommended a change in the rule shortly after that. They met that afternoon and issued the draft.

Mr. PLAPINGER. What was that in connection with?

General ARNOLD. I am trying to recall what it was.

Mr. PLAPINGER. Was it concerning flights off airways?

Mr. TIMMERMAN. Of course, we have advocated for a long time the establishment of more airways so we would not have to fly off airways. This has been a continuing program with us for many years, but that does not require rule changing; it only requires implementation.

Rule changes that we advocated or that we were advocating about the time of the Grand Canyon accident related to such things as increased visibility.

In many cases we feel that it should be increased from 3 miles, which it is today, to 5 miles; and changes of that kind we have advocated.

We have advocated the establishment of control zones at all airports where instrument approach operations are conducted.

We supported the CAB—we did not invent this one, but we supported the idea of the 500-foot levels for the assignment of VFR traffic, while the IFR traffic would be at the thousand-foot levels.

We supported, in fact advocated, the standard altimetry methods instead of the methods used today. The Board has not promulgated a rule on this yet; however, they have a draft release out on it.

Mrs. GRIFFITHS. When you support a rule, do you do it in writing or orally?

Mr. TIMMERMAN. Both, usually.

General ARNOLD. Both.

Mrs. GRIFFITHS. When you get information on the cost, if it would have a cost attached to it, of instituting such a rule—that is, the cost to the average user of the airliners and to the commercial users—do you get information on the safety and other such factors?

General ARNOLD. Primarily, just recalling, there are a number on which the costs are very difficult to obtain. And again, the safety is one of opinion. But, for example, we recommended, several years ago, the elimination of on-the-top holdings at night. Now, this is an economic penalty; and how to evaluate it? We did not even state that it was an economic penalty. We only stated it in the interest of safety——

Mrs. GRIFFITHS. Yes.

General ARNOLD. In the interest of safety, it should be eliminated, and it was.

Mrs. GRIFFITHS. Yes.

Mr. PLAPINGER. Have you ever advocated eliminating the on-top requirement?

General ARNOLD. Yes.

Now, an on-top clearance and on-top holding are two different things.

Mr. PLAPINGER. You had better enlighten me, General.

General ARNOLD. Well, holding on top can be confined to the discretion of the controller, to hold aircraft so that they are visually maintaining separation and visually clear of the cloud; whereas, I can file an instrument flight rule and climb up and get separation until I maintain a thousand feet on top.

Mr. PLAPINGER. How can you tell when you are a thousand feet on top?

General ARNOLD. This is the difficulty with such a clearance. You are quite correct. If the cloud were smooth and you could get it accurately, you would be constantly changing your altitude if the elevation of the cloud, say, changes from 1,000 feet to 5,000 in your flight.

This is a problem, and one which is necessarily being resorted to in order to accommodate the aircraft today. If this rule were eliminated, as estimated on the military operation—what would be curtailed; approximately 30 percent of their operations?

Mr. TIMMERMAN. I would guess that, at least.

General ARNOLD. Under the present system.

Mr. TIMMERMAN. In answer to your question, though, we did advocate the elimination of holding on top, to distinguish it from cruising on top. However, in our voluntary program, recently we eliminated the practice of cruising on top as a cruising altitude above 10,000 feet.

Mr. PLAPINGER. Let me ask you something, getting back to DME again. The Grand Canyon crash involved a DC–7, and I do not remember the other plane.

Mr. TIMMERMAN. Super Constellation.

Mr. PLAPINGER. Super Constellation. What is the cost of those planes?

General ARNOLD. Oh, I think it is around $1.7 million to $2 million each, depending on when they were purchased. But roughly, say $1.75 or $2 million, if you want to round it out; roughly between $3.5 million to $4 million total cost.

Mr. PLAPINGER. What is the cost of a Viscount?

Mr. TIMMERMAN. A million and a quarter?

General ARNOLD. It is remarkably less. As I recall, the Viscount is less than a million dollars. Does anyone know?

Mr. TIMMERMAN. I do not know.

General ARNOLD. I have seen the figure, but I do not——

Mr. PLAPINGER. How long would it take a concern to replace one of these planes that crashed?

General ARNOLD. You mean put in their order and get one?

Mr. PLAPINGER. Yes.

General ARNOLD. Today, you talk about a DC–7 I imagine, it might take from 8 to 14 months.

Mr. PLAPINGER. And how much business would be generated by one of these planes if it had been in operation for that period?

General ARNOLD. Let's see; load factor, roughly, on those systems would be 60 percent—I think it is 58, but say 60 percent. We will say that they averaged 80 passengers. Or say 50 passengers if you want to call it that—50 passengers; 8 hours a day. Then we run, say, 300 miles an hour. I can figure it all out, if you want.

Mr. PLAPINGER. What I am getting at is: Would it not have paid the airlines, with the loss of some 186 lives in these 3 disasters, with the replacement cost of the civilian planes involved, not calculating the loss to the military in the Grand Canyon crash, the Nellis crash, the

Brunswick crash, to have installed some distance-measuring equipment, so that the loss of business, the terrible human tragedy involved, and, possibly, the increase in insurance premiums as a result of the crashes would have been averted? Would that not have compensated for any investment that the airlines would have made in distance-measuring equipment during this period?

General ARNOLD. It certainly would have, and the airlines are the first ones to agree that they would have bought 10 DME's if they thought it would have eliminated the accident.

Mr. PLAPINGER. Of course, we do not know whether it would have eliminated the accident.

General ARNOLD. We think, very positively, it would not.

Mr. PLAPINGER. You think, positively, it would not?

General ARNOLD. It would not.

Mr. PLAPINGER. Why is that, General?

General ARNOLD. Well for the simple reason that I do not believe the distance itself—unless we assume that the information could be correlated with our present system of traffic control and disseminated to the point of giving a particular warning——

Mr. PLAPINGER. In the Grand Canyon crash, the two planes were apparently in communication with the CAA.

General ARNOLD. That is right.

Mrs. GRIFFITHS. Gentlemen, I am sorry to interrupt, but we have to be on our way.

I want to thank you very much, General Arnold, for being here. It is very kind of you. I think you have been very informative and very helpful.

General ARNOLD. Thank you. I appreciate the opportunity.

Mrs. GRIFFITHS. Thank you.

I would like to ask Mr. Burnard if he would come back tomorrow at 10 o'clock. We will be pleased to have you then.

The meeting is adjourned.

(Whereupon, at 12:03 p. m., the subcommittee recessed, to reconvene at 10 a. m., Wednesday, July 30, 1958.)

FEDERAL ROLE IN AVIATION

(1958)

WEDNESDAY, JULY 30, 1958

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON LEGAL AND MONETARY AFFAIRS
OF THE COMMITTEE ON GOVERNMENT OPERATIONS,
Washington, D. C.

The subcommittee met, pursuant to recess, at 10:10 a. m., in room 1501, New House Office Building, Representative John A. Blatnik presiding.

Present: Representatives John A. Blatnik, George Meader, and Jack Westland.

Also present: Jerome S. Plapinger, counsel; and Elizabeth D. Heater, clerk.

Mr. BLATNIK. The Legal and Monetary Affairs Subcommittee of the House Government Operations Committee will resume its hearings on the Federal Role in Aviation.

This morning our first witness will be Mr. E. Thomas Burnard of the Airport Operators Council.

Mr. Burnard, I understand we were not able to reach you yesterday to testify. I appreciate your returning this morning.

STATEMENT OF E. THOMAS BURNARD, EXECUTIVE DIRECTOR, AIRPORT OPERATORS COUNCIL (INCORPORATED), WASHINGTON, D. C.

Mr. BURNARD. Thank you, Mr. Chairman.

I was happy to defer to the Premier of Italy.

Do you wish me to proceed with my statement?

Mr. BLATNIK. Will you please proceed?

Do you have a prepared statement?

Mr. BURNARD. Yes, sir, I do.

Mr. BLATNIK. And give a brief statement for the record. Identify yourself with biographical data.

Mr. BURNARD. My name is E. T. Burnard. I am executive director of the Airport Operators Council. The council is a nonprofit trade organization comprised of the organizations and agencies which own or operate the principal large and medium hub airports of continental United States, Hawaii, and Puerto Rico, which are served by the airlines. These airports handle approximately 76 percent of the domestic enplaned scheduled air passengers and 99 percent of the international and overseas scheduled air passengers. Our members also own and operate many general aviation airports.

I am a graduate of the University of Pennsylvania Wharton School of Finance and Commerce and of the Law School. I served as a United States Naval Reserve officer from 1942 to 1946, with the Office of Naval Intelligence, and my work included liaison work with the Fifth Air Force, including fighter command assignments and bomber command assignments in the Pacific. I have held a private pilot license since 1940.

Since the end of the war I have been associated with the Air Transport Association, from 1946 to 1955, in the general counsel's office first, and later in the operations and engineering division, handling primarily domestic regulations and international standards as they relate to the airlines.

Since March of 1955 I have been the executive director of the Airport Operators Council. In that capacity I am the principal staff employee of an association of what is now 46 airport operators comprising the principal airports of the United States.

We also have one non-United States member, but in accordance with the council's bylaws, only the United States members have participated in the preparation of this statement and the deliberations leading thereto.

The council welcomes this opportunity to discuss with you some aspects of the operation of the Civil Aeronautics Administration, the Civil Aeronautics Board, and the Airways Modernization Board as they relate to airports. We understand from the chairman's opening remarks that you are primarily interested in determining the economy and efficiency of the operation of these agencies as they relate, among other things to nonmilitary jet planning, jet noise, the national airport plan, and other aspects of airport developments.

I will try to highlight briefly some aspects of these matters as we see them.

Of all elements in our national system of aviation facilities, airports have been the most neglected. Unless airport development is given the attention it deserves, airport capacity may well become the factor that limits capacity in the whole system.

This was the judgment of Mr. E. P. Curtis, President Eisenhower's Assistant for Aviation Facilities Planning, in his report entitled "Modernizing the National System of Aviation Facilities" in May 1957.

Mr. Curtis also recognized that—

airports are an integral part of the system of aviation facilities. However, unlike other elements of the system, airports are designed, built, financed, and operated by local authorities. This imposes the necessity for coordinated national and local effort to insure that airports do not become the neglected element of the overall system. We believe the Federal Government should exercise the leadership necessary to assure that this coordination takes place. * * *

Frankly, gentlemen, this was the first time in history that the executive branch of the Federal Government publicly recognized the important role of airports in aviation development in this country.

The Congress expressed its interest in 1938 when the Civil Aeronautics Act empowered and directed the Administrator of the Civil Aeronautics Authority (now the Administration)—

to make plans for the orderly development and location of landing areas, airways, and other aids and facilities for air navigation * * *

The Federal Airport Act was adopted in 1946 for the purpose of aiding in—

the establishment of a nationwide system of public airports adequate to meet the present and future needs of civil aeronautics.

But notwithstanding these mandates from Congress, there has been a vacillating, lethargic, and even hostile attitude at times by the Government agency with primary responsibility for carrying them out.

Just last week the official Commerce Department position was put in the record of these hearings opposing the enactment of a bill which would extend the life of the Federal Airport Act another 4 years, and make possible airport development vitally needed to the present and future development of air transportation in this country.

Only the Civil Aeronautics Board, among the Government agenices, has recognized officially in these hearings on airport legislation that—

adequate and improved airports are essential for jet operation and the safe and expeditious movement of all aircraft in the air-traffic control system.

The need for Federal leadership in airport development is threefold:

1. Technical guidance.
2. Research and development.
3. Financial participation, where needed.

An airport is not merely a local facility. It is part of a system—both national and international.

It is something like a telephone. A single phone instrument has little utility unless it is a part of a system. An airport, although built, owned, and operated locally, is an integral part of our interstate airways system and of our national system of air transportation. Great airports at places like New York, Miami, San Juan, Los Angeles, San Francisco, Honolulu, Seattle, and Chicago, to name but a few, are presently also part of an international system of air transportation. The day is fast approaching when places like Atlanta, Pittsburgh, Kansas City, St. Louis, Denver and other so-called inland cities may be as integral to the worldwide system of air transportation as are the coastal cities today.

For this reason, research, technical and financial assistance must come from a central authoritative source.

In the early years of the Federal airport program, funds were appropriated not only for financial assistance to airport sponsors but also to provide for Government planning and research useful both to the local sponsors and to the Federal agency designated to administer the act. This basic planning data, however, reached a peak in the years 1948 to 1950. Through lack of funds appropriated by the Congress, and through lack of forceful leadership and adequate planning by the Federal agency, this data and information has become obsolete and inadequate for present and future planning.

We believe that CAA Administrator Pyle and his staff are working overtime now trying to make up for this deficiency, but much remains to be done.

In the matter of jet planning, for instance, even today, in July 1958, with only a few months remaining before jet transports are scheduled to go into service, few reliable facts have become available from any source on such vital matters as airports to be served, runway lengths,

ramp handling, passenger and baggage loading, and other terminal facilities needed.

Mr. MEADER. Mr. Chairman, may I interrupt at that point?

Mr. BLATNIK. Yes, Mr. Meader.

Mr. MEADER. I notice you don't say anything about separation of major airports in a terminal complex. Do you consider that, also, to be a matter which should have been studied along with runway lengths, ramp handling, and passenger and baggage loading?

Mr. BURNARD. Yes; we do. My statement relates primarily to jet planning. A little later on, I refer to the need for research and development in the airport field in which we do touch upon the need for better information on location of airports.

Mr. MEADER. You didn't omit that because you don't think the separation of airports in a terminal area needs to be studied in connection with the use of commercial capacity?

Mr. BURNARD. No, sir; we do not. We consider that one of the vital problems that needs to be solved in order to assure that the greatest potential capacity from airports can be achieved in the future.

Mr. MEADER. You have two things involved. That is safety and capacity.

Mr. BURNARD. That is correct.

Mr. MEADER. The CAA says they are safe because they control them to see that they are safe, but somebody may have to wait to use the airport.

Mr. BURNARD. That is correct.

Mr. MEADER. If you have two airports located in close proximity to each other, the capacity of either one is impaired because of their proximity or you engage in more hazardous operations to get the greater capacity of those two airports; isn't that true?

Mr. BURNARD. That is correct. The relationship of the location of airports in what you might call a metropolitan complex is very important to the efficiency and safety with which that community can be served.

Mr. MEADER. And you think that is a subject which should have received the active and intensive attention of the CAA, in the light of the prospective use of jets commercially?

Mr. BURNARD. I would like to make my answer a little broader than with specific relation to jets. It is an overall problem, whether we have jets or any other kind of an airplane. The proper location of airports is essential to the continued development of air transportation.

Mr. MEADER. I want to go into this more thoroughly a little later on. Where you mentioned it here, it seemed to me there was an omission in your statement that I wanted to call your attention to as you were reading it at that point.

Mr. BURNARD. Yes, sir. Where I have used "airports" in the prepared statement, perhaps it would have been better to have used the word "communities" to be served; in other words, we are still not sure from any very reliable source as to exactly what communities are going to be served by jets, irrespective of specific airports serving that community.

It was just last week that the CAA showed this committee a chart of United States communities to be served by jets in 1959, 1960, and 1961. Such information has not previously been made available by the CAA for general distribution.

It was just this month, on July 2, that the CAB finalized its special regulation 422A which will determine, in part, the take-off runway lengths needed for jet transports. Until the performance and certification requirements were known by the manufacturers, reliable information could not be provided on airport-runway lengths needed. And we understand that the manufacturers have already sought a change in SR 422A because of its unduly long runway requirements. AOC has also protested this regulation.

Actual runway requirements, however, can only be determined when the airlines state clearly what they plan to do with the aircraft. Jets will carry nearly half their weight in fuel. Runway requirements are directly related to takeoff weight. Takeoff weight is directly related to fuel load, and fuel load is directly related to distance to be flown. Variations in airline route patterns will cause equally great variations in their runway requirements, and airline operating procedures will further influence them.

These are some of the reasons why the CAA, in May of this year, brought out a proposal to change TSO–N6a: Criteria for Runways and Taxiways, which is still under study.

I would like to add in that connection that we have—the Airport Operators Council have—since October 1955, when Pan American Airways first announced their order for jets, and then other airlines announced their orders, shortly thereafter—we, the Airport Operators Council, have been trying to find out from the CAA and from the airlines, both through their trade association and individually, exactly what these aircraft are going to need in the way of airport facilities.

Among some of the things we have asked of the CAA was: Did they plan to change their TSO–N6a runway criteria, or didn't they?

As I have pointed out here this morning, it has been just this month, or, rather, just in May, that the CAA came out with a proposal, and just this month that the CAB finalized its turbine-engine performance and certification regulations.

Mr. PLAPINGER. To what do you attribute this delay, Mr. Burnard?

Mr. BURNARD. Several reasons, I would assume, contribute to it.

Mr. PLAPINGER. But they have known what the runway lengths were going to be at the time they placed the orders.

Mr. BURNARD. Before the airlines place orders for airplanes they get route analyses from the manufacturers. It is part of the sales program of a manufacturer to show an airline how its particular airplane can be used on its routes. They must have had a pretty good idea as to where they could use the airplane and how they could use it, even before they placed the orders.

Mr. PLAPINGER. Did AOC ever make any attempt to obtain this information from the manufacturers?

Mr. BURNARD. Yes; we have inquired of both the manufacturers—in 1955, we inquired of the manufacturers, and we received responses which indicated that, generally speaking, the aircraft being designed and built were being designed and built for present airports. (See appendix, exhibit 7, p. 499.)

Subsequently—as a matter of fact, in September of 1957—our individual members sent to the individual airlines a very comprehensive questionnaire on all aspects of airport development, requesting information which would be useful for planning purposes. The response

has been somewhat sporadic and somewhat disappointing. We have not received the complete information that is necessary to do a real airport-planning job.

Mr. PLAPINGER. Is the CAA at fault here in this matter if the manufacturers have told them, as they have told us during our 1956 hearings, that the planes would fit existing airports? Here we are talking about planes that were not then in existence.

Mr. BURNARD. That is correct, sir. The CAA, in January of 1956, when Mr. Lowen was Administrator, called a CAA jet-planning meeting, to which were invited manufacturers, airlines, and airport operators. It is the only such meeting that has been held since the so-called jet age started where the viewpoints of the various interested segments were expressed.

As I understand it, there have been meetings with the airlines and with the aircraft manufacturers from which they have derived certain information and they have produced their so-called jet-planning progress reports. But there is very little definitive information in these reports which makes possible airport planning.

Mr. PLAPINGER. Are you saying that the CAA has this definitive information and has not made that available to you despite your requests?

Mr. BURNARD. I don't know whether they have it or don't have it, but we don't have it. It is not available to us.

Mr. PLAPINGER. Have you inquired as to whether they do have it?

Mr. BURNARD. We have inquired on several occasions.

Mr. PLAPINGER. And the response?

Mr. BURNARD. We had no response to two letters.

Mr. PLAPINGER. When were those letters written, Mr. Burnard?

Mr. BURNARD. One was written in February of 1956 on the overall jet-planning coordination process, and one in July of 1955, with respect to runway lengths. We did get an answer to that one, and we were told that they did not expect to revise the TSO–N6a in any major respect. (See appendix, exhibit 7, p. 499.)

Mr. PLAPINGER. Do you consider the present proposed revision a major revision?

Mr. BURNARD. It adds 2,100 feet to a runway. That is a sizable amount.

Mr. PLAPINGER. To a runway of 8,400 feet?

Mr. BURNARD. Yes.

Mr. PLAPINGER. What is the cost of an extension of that type?

Mr. BURNARD. It will vary from airport to airport, but, as a horseback guess, the figure we have used is around a thousand dollars a foot, or a million dollars a thousand feet.

Mr. PLAPINGER. So that to extend an 8,400-foot runway 2,100 feet would cost somewhere over $2.1 million.

Mr. BURNARD. Yes; that is correct. In metropolitan areas, to that you have to add the cost of the approach zone, the clearance of obstacles, and the so-called clear-zone acquisition. Frankly, in many cases of high-density metropolitan areas, the cost of the approach and clear zones can exceed considerably the cost of the land and the concrete. So, it is a combination that presents itself as the problem to the airport operators.

Mr. PLAPINGER. Did the piston-driven engine require these corridors at either end of the runways?

Mr. BURNARD. The CAA clear-zone policy went into effect before the jets—well, it went into effect last July; so the jets were well underway. There has never been any statement by the CAA, to my knowledge, that the clear zones are directly related to jet operations. Their stated reasons and philosophy appear to be that it improves the general safety, but it has not been related, to my knowledge, to jet operations, as such.

Mr. WESTLAND. Mr. Chairman, may I ask a question?

Mr. BLATNIK. Mr. Westland.

Mr. WESTLAND. Are any of the major airports in the country today of too short a length to handle these 707's or the DC–8?

Mr. BURNARD. Mr. Westland, the relationship between adequacy of runways and a jet airplane is directly proportionate, as I have just said, to where the airplane is going, and that determines the weight of the airplane. A very lightly loaded Boeing 707 or DC–8 can get into a very small airport and get out of it, but it can't go very far. So, depending on where the airplane is going, you have to take that into account in determining whether the runway lengths are going to be adequate.

Mr. BLATNIK. Would the gentleman yield at that point?

Mr. WESTLAND. Yes.

Mr. BLATNIK. Isn't that true of any aircraft?

Mr. BURNARD. It is much truer with respect to jets than with conventional aircraft, although the basic principle is true with conventional aircraft.

Mr. BLATNIK. You still have to have pretty close to the feasible maximum runway lengths available in case an extreme situation arises.

Mr. BURNARD. Except that in airplanes like the DC–7 or Super Constellation, the fuel load constitutes, as I recall, roughly one-fourth the total weight, takeoff weight, whereas, with a fully loaded 707 or DC–8, it will constitute nearly 50 percent of the total weight.

Mr. WESTLAND. One of the reasons I asked that, Mr. Burnard, was because in my home area we see the 707 constantly taking off from Boeing Field, where it is hazardous, in my opinion, to even land a Piper Cub, and I was wondering whether, in your opinion, any of these major airports are inadequate at the present time to handle that 707 fully loaded, let's say, on a hop from San Francisco to New York or San Francisco to Washington or Los Angeles to Chicago or any of that type of flight.

Mr. BURNARD. The adequacy or inadequacy of the airport runway, as I say, is directly related to the takeoff weight of the airplane. Runways are being lengthened at places like New York, San Francisco, Los Angeles, Seattle to accommodate the greater runway needs of the jets on the long-haul operations.

Mr. WESTLAND. Of course, I don't really know whether or not a 707 is taking off from Boeing Field to fly to New York. I would assume that it had. It might not have been loaded with 150 or 140 people plus their baggage, but I would assume, I think the plane has done that, hasn't it?

Mr. BURNARD. Yes; I believe it has, from what I have read in the newspapers. My guess is that the airplane probably hasn't taken off with gross loads of greater than 200,000 to 220,000 pounds on these flights, and it is an airplane designed for weights in the neighborhood—well, some are between 250,000 and 275,000 pounds. There

are different versions of the Boeing 707. It is a little hard to say which one has which weight.

But the long, intercontinental version of both the DC–8 and the Boeing 707 are designed for gross loads—this is the initial version—of in the neighborhood of 290,000 pounds. There is reason to think that, like the history of other airplanes, those weights will be increased as the manufacturers and the airlines learn more about the operation and the construction of the airplanes.

In other words, like the Constellation airplane, the fuselage has been stretched out and the airplane has been beefed up and the gross loads that it has carried have gone up considerably from the original –049 version of the Constellation to the present version, the present superjobs.

Mr. WESTLAND. Actually, it was my thought that these airports had a greater problem in handling that weight rather than they did in handling the length of the runway.

Mr. BURNARD. We are happy to say from what we have learned from the manufacturers to date that the distribution of the load on the undercarriage will not create the severe problem that we anticipated in the first place.

Only experience with the airplane will tell us whether this is so or not.

We are hopeful, though, that the manufacturers are right in this respect because, if it is not correct, then the airports will have a terrific problem.

To beef up a runway is a major operation.

Mr. PLAPINGER. Mr. Burnard, to return to Congressman Westland's original question, it seems to me that your answer would be, "No," that present airports are not equipped to handle the intercontinental 707 without runway extension.

Mr. BURNARD. Some airports probably could handle them right now.

We have to know really whether we are talking about a flight from, say New York to London, or a flight from New York to Rome or New York to Cairo.

Mr. PLAPINGER. Where will the first jets be used? I gather they will be used first by Pan American to handle transatlantic travel.

Mr. BURNARD. From their public statements they apparently plan to use them on the North Atlantic run. It's the blue ribbon route, of course, and it is the most highly competitive between United States carriers and other carriers.

Mr. PLAPINGER. What airport is equipped to handle that plane right now?

Mr. BURNARD. Places like Boston, New York's Idlewild.

Mr. PLAPINGER. How many transoceanic flights are there from Boston at the present time as compared to a place like New York?

Mr. BURNARD. There is also Philadelphia.

I can't tell you about the number of flights from Boston as compared to New York, not offhand. It is a far smaller percentage.

Mr. PLAPINGER. Is New York equipped to handle this sort of operation?

Mr. BURNARD. What I was going to say is that places like Boston, New York, Idlewild, Philadelphia, Friendship, Baltimore, could all

handle a trans-Atlantic flight, but the flight might have to stop at Shannon, London, or Paris.

Mr. PLAPINGER. For refueling?

Mr. BURNARD. Yes.

I can't tell you right now how far the airplane could go. I am pretty sure it could get across the pond. Where it would have to stop on the other side, you would have to get that from the airlines at the present time.

Mr. PLAPINGER. Did I understand correctly that Idlewild has lengthened its runways?

Mr. BURNARD. It is under construction now.

Mr. PLAPINGER. For this purpose presumably; is that right?

Mr. BURNARD. Yes, for future operations.

We believe that many of today's problems can be minimized and many of tomorrow's may be eliminated if a coordinated systems approach is made to aviation's problems. Expedience has been the only approach to date, both in Government and in industry.

Aircraft designers and manufacturers, spurred by military requirements, have designed and built aircraft with little or no regard for the support facilities required to keep them operating. The whole ground and air environment, both in military and civil operations, has been expected to adjust with each new development, but the time is fast approaching, if it has not already been reached, when aircraft development must be integrated with support services development. Investments in ground services, which no doubt exceed investments in airborne equipment, cannot, in civil transport service, be jeopardized without good reason. They don't need to be if a proper planning relationship is established between the aircraft producers, the aircraft users, the airport providers and the providers of traffic control, navigational aids, communications, weather services and the like.

Ideally, such coordination would be done voluntarily and at an early stage of development of significantly different aircraft. History has shown that it has not been done voluntarily, so it becomes important that the Federal Government assures coordination.

Research and development on airport design, configurations, and capacity has been the most neglected of all aviation subjects. Huge sums of money are spent annually by governments, universities, and industry on aerodynamics, propulsion, communications, navigation, air traffic control, and other basic elements of aviation, and tremendous progress has been made.

Among the more urgent of these technical problems on which research is needed are the following. They relate primarily to the increase or determination of airport capacity and include:

(*a*) Runway and taxiway configurations.
(*b*) Visual aids.
(*c*) Ground traffic control.
(*d*) Multiple airport configurations.
(*e*) New airport locations.
(*f*) Airport layouts.

In this connection, Congressman Meader, I might say that on the first item, that of runway and taxiway configurations, we are still trying to find out from some authoritative source just how far apart parallel runways should be.

It has not been possible to date to get from the CAA or any other official source an authoritative answer on just how far apart parallel runways should be to obtain maximum utilization of those runways.

Mr. PLAPINGER. Isn't there a CAA criteria for separation of parallel runways?

Mr. BURNARD. No. They treat it on a case-by-case basis, and 3,000 feet has been bandied about as a rough approximation of where it might be, but if you try to get the CAA or the airlines or the pilots or any other operation specialist to say, yes, 3,000 feet, or 2,000 feet, or 2,500 feet, or 3,500 feet, is the right place to put the runway which will give simultaneous instrument-flight-rule operation, it is almost impossible to get an answer.

Mr. PLAPINGER. Let me ask you this, Mr. Burnard. The CAA, as I understand it, has a general policy of single runways in financing under the Federal Airport Aid Act. There must have been airports that have wanted to put in two parallel runways, and certainly from the number of applications that have been processed with the two parallel runways, there must have been some criteria developed.

Mr. BURNARD. There are a number of parallel runways in existence. But we are quite sure they don't get full utilization. They may be fully utilized under visual-flight conditions and they may be partially utilized under instrument-flight conditions, but they are not fully utilized under instrument-flight conditions.

You cannot operate the two runways independently of each other under instrument conditions for takeoffs and landings.

Mr. WESTLAND. Has this airport operators' organization, the Airport Operators Council, made any recommendation?

Mr. BURNARD. Yes, we have asked the CAA several times for information on it. We have made very strong recommendations to the Curtis group and additional recommendations to the Airways Modernization Board.

The Curtis group incorporated in its report and recommended a good many of the things we pointed out as deficiencies. The Airways Modernization Board has already started an airport-research program which does include some of these things, and we sincerely hope that the Federal Aviation Agency, when and if it comes into existence, will continue with such research and development. The problem we have had is that the handling of the airport problems in the past seems to have been separated from air-traffic control and air navigation facilities problems.

In other words, in the administration of the aviation program by the CAA, they have been handled separately, with insufficient coordination between the two. The fact of the matter is that the efficiency of the airways is greatly dependent upon the efficiency of the airports. The airways capacity must be kept in balance with the airport capacity.

Mr. WESTLAND. You made a specific recommendation, like 2,500 or 3,000, or 5,000 feet.

Mr. BURNARD. No, sir. We haven't made any specific recommendation because the final figure is determined by the accuracy of the navigational aids and the air-traffic-control procedures that can be used, as well as by the efficiency of the operation of the aircraft; that is, the pilot's efficiency, as well as the operating procedures of the airlines.

Mr. WESTLAND. I would think the Airport Operators Council would probably be as well informed or have as strong ideas as to how far runways ought to be separated as perhaps anybody; wouldn't you think so?

Mr. BURNARD. We have ideas, but in aviation, as you are probably well aware, there is a great deal of coordination that must be achieved before you have any assurance that the money you are spending is being spent properly.

For instance, the approach-lighting program back several years ago involved many experiments, and the CAA thought they had the answer when they came up with the slope line, but, when the pilot started operating with those slope-line lights, they found some actual danger was involved. So all of the preliminary work that was done on the slope-line lights had to be thrown out of the window, and they used a different system.

So, it would be difficult for us to say, as airport operators, "We are going to place this runway 3,000 feet from the other one," only to find that the pilots weren't using it or the air-traffic control wouldn't instruct aircraft to use that runway under certain conditions. We feel we must know in advance before spending the money that the people who are going to use it are going to use it efficiently.

Mr. WESTLAND. Perhaps that is one of the reasons the CAA hasn't come out saying thus-and-so; that it should be 2,000 or 3,000 feet.

Mr. BURNARD. They haven't indicated that that is their reason, if it is.

Mr. PLAPINGER. Do you maintain any research facilities? By "you" I mean the Airport Operators Council?

Mr. BURNARD. We do not. I personally feel we should be doing more about that, but in some respects we are a relatively new organization. We are also a very low-budget organization.

Mr. PLAPINGER. That is a familiar story, Mr. Burnard, to the Government Operations Committee.

Mr. BURNARD. I know. We don't have the capability at the present time, however.

Mr. PLAPINGER. Take somebody like Idlewild. That is a fairly extensive operation—the Port of New York Authority. Certainly, they must have research facilities and must have come up with some criteria. I don't know that there are many organizations like the Port of New York Authority in the country.

Mr. BURNARD. The Port of New York Authority has done some excellent work, and they shared, with anyone who wanted to know, the results of the work that they have performed, and they have contributed a great deal to our organization through their efforts.

Other airports have, likewise, contributed a great deal. At San Francisco, for instance, the University of California, in cooperation with the San Francisco Airport authorities and United Airlines, have conducted a very excellent high-speed-turnoff test. But, unfortunately, when those results come out, they are not sufficiently authoritative. They don't have the official Federal stamp of approval, particularly for spending Federal funds.

Mr. PLAPINGER. I understand that. But they certainly must be fairly persuasive, coming from an organization like the Port of New York Authority, to use in your discussions with the CAA.

Mr. BURNARD. They are. And we use all the information we can get our hands on from our own members for these purposes. They still aren't authoritative enough or persuasive enough to have the CAA come out with a firm criterion that this is the way airports should be built.

Mr. WESTLAND. I am certainly inclined to agree with you [to Mr. Plapinger] on that. Everybody seems to assume that this is entirely the function of the Federal Government; to tell how the airports should be built. It would seem to me that your Port of New York Authority or the port of Seattle or San Francisco or Chicago, or whatever they have, can do an awful lot of that sort of work themselves, and bring out information, just as you say, that can be of great value, both to you and the CAA, in putting their stamp of approval on it. I would like to see some of these local organizations do some of this work; not wait for the Federal Government to try to do the whole thing.

Mr. PLAPINGER. Mr. Johnson and I were taken through the Port of New York Authority. I must confess the level of my technical competence is rather low. It is a very impressive organization, and people seem to know what they are talking about up there. It would seem that an organization like yours, with that intelligence behind it, could act as a real catalytic agent upon the CAA.

Mr. BURNARD. I agree with you in principle, Mr. Congressman. We are, in a somewhat feeble way at the moment, trying to do something about it, but the real problem is one of coordination.

Mr. WESTLAND. Sure.

Mr. BURNARD. Even if we came out with the best criteria in the world, it wouldn't do any good unless it had acceptance by the pilots, the airlines, and the Federal Government.

Mr. WESTLAND. I understand that; yes.

Mr. BURNARD. We are greatly heartened by the airport-research program being undertaken by the Airways Modernization Board, which is designed to find answers to some of these problems. The AMB has already undertaken some high-speed-exit taxiway tests, the results of which should become available soon.

This research must be continued and accelerated. To develop the airway capacity without comparable development of the airport capacity in the same system is, obviously, a fruitless exercise. Even more basic, however, we believe that the aerial vehicle and the environment in which it will operate must be planned together.

As Mr. Curtis told the Society of Automotive Engineers last year—

> there has been a decided tendency in the past to design and build maximum-performance aircraft on the assumption that somehow airports will be built to accommodate them.

He continued, and we wish to emphasize, that—

> instead of demanding more and more concrete, the designers must make maximum use of the techniques like boundary layer and jet flap control to improve the takeoff and landing characteristics of our future planes.

We might add, in that connection, that there are experimental plans flying today with boundary layer control and jet flap incorporated in them. If enough impetus is given to this development, it can go a great way toward solving, slowing down fast airplanes in terminal areas to improve the air-traffic-control situation, and it also makes possible greater utilization of runways and airports.

Mr. PLAPINGER. One of your own members, Mayor Hartsfield, of Atlanta, made a very moving plea along those same lines sometime before, even before our 1956 hearings.

Mr. BURNARD. It has been one of the policies that we followed in the Airport Operators Council that development along these lines should be urged and promoted by the Federal Government as well as by the industry. We view this as an even larger problem. It requires not only the attention of the designers, but of the airlines and other users, coordinated through the Federal Government with those who provide the facilities and services necessary to enable the aircraft to operate in a safe and efficient manner.

More specifically, now is the time, through the appropriate Federal agencies, to start the machinery for exploring the ramifications of high-lift devices on conventional (fixed-wing) type aircraft, VTOL, STOL, and other high-lift, short-range vehicles of the future, supersonic aircraft, atomic-powered aircraft, and those powered by exotic fuels, spaceships.

Each of these aircraft and propulsion developments will influence navigational, air-traffic control, communications, and airport development.

Because airports must be financed on a long-term basis of 20 to 30 years, it is imperative to know reasonably well in advance what developments to expect in order to build in appropriate safeguards and expansion possibilities. It is a sad fact that, among airport operators, each new major terminal development, which takes years to achieve, is dedicated with the realization that it is probably obsolete or too small on dedication day. After the aeronautical needs are determined, it takes years to arrange the financing and construction. The airport facilities needed for the jets of tomorrow should have been known at least 3 to 5 years ago.

It is because of the great lead time necessary to convert aeronautical needs into airport facilities, and the need for determining the probable useful life of a multi-million-dollar development, that integrated systems planning must be done.

Community relations play a vital role not only in the long-range planning for airports, but also in its current operation. The long-range planning will always be circumscribed by considerations of changing public opinion, and noise is one of the primary concerns that we have. If we are able to obtain quieter airplanes and, preferably, steep-gradient takeoff and landing types of aircraft, then we will get much more flexible operation both in the air and on our airports, and a more satisfactory relation with the community.

The engine and airframe manufacturers are to be commended for their efforts to date to dampen the noise and annoyance of civilian jet transports. Test results on noise characteristics of the Boeing 707, however, have not yet been released, so it is premature to say whether or not they will be satisfactory.

In this connection, I might add that the Port of New York Authority announced last week, I believe, that, through arrangements with Pan American Airways, they will be operating some Boeing 707's out of the New York airports at reduced takeoff weights on an experimental basis in the near future. This is to help both the airline and the authority gain experience on the aircraft's operation and its noise effect on the community. But I do emphasize that it is at a reduced takeoff weight.

A seriously complicating factor with jet noise is the fact that, even when decibel reduction is achieved, human annoyance may still be high because of the character of the noise, just as the shriek of an engine whistle may be more annoying than the beat of a drum when both are at the same decibel level.

We cannot urge too strongly that the Federal Government expedite research to achieve noise suppression on both military and civil aircraft. We know that the noisy military aircraft have created unfavorable reactions in many communities, and that may jeopardize civil jet operations. If suppression of the noise from jets operated out of civil airports is not accomplished, we believe that the entire Federal investment, as well as the local investment, in many aiports will be jeopardized. And, with respect to military jet noise, we know of no steps that have been taken to date to suppress it. We would suggest, however, that, if jettisonable aircraft fuel tanks can be devised, surely, detachable or jettisonable noise suppressors should be considered so that military jets can be "housebroken" during peacetime and yet have full power available when needed.

The committee may be interested in knowing that there are a number of cases presently pending before the United States Court of Claims, cases arising out of Air Force jet operations at Air Force bases, and I have with me, if you are interested, a list of these pending cases. There are 15 on this list, 1 of which was decided in June in favor of the plaintiffs.

Mr. PLAPINGER. What was the complaint?

Mr. BURNARD. They add up to a considerable amount of money to the Federal Government.

Mr. PLAPINGER. What is the legal injury complained of?

Mr. BURNARD. A taking of property.

Mr. PLAPINGER. Use of the airspace above the property?

Mr. BURNARD. Enjoyment of use and taking of property. The plaintiff's argument, generally, follows the decision in the Causby case. With respect to financial participation, we believe that there are compelling and urgent reasons both for the continuation of the Federal airport program and for a substantial increase in the level of the program. Briefly, they are these:

First, stability in Federal and local planning airport development, made possible for the first time by the 84th Congress with the present 4-year program, will be lost when this program expires in fiscal year 1959, unless it is extended by this Congress.

The lead time in airport development—that is, the time necessary to do the enormous detail of planning, financing, and construction of airports and airport improvements—constitutes one of the most difficult and critical problems with which we are faced.

Since 1955, when assurance was given by the Congress of at least 4 years at $63 million per year, the communities, for the first time, have been able to develop specific long-range plans. But, because the act is about to expire and because the funds available to date have been inadequate to achieve the tremendous improvements needed, we are now approaching a most critical period.

The communities are now geared up to get this program off the ground, the basic engineering and economic studies have been made, and the projects await only the green light of financial ability to be carried out.

Second, the interstate character of air transportation, the importance of air transportation to our national economy and national defense, and the integral role of the airports in the development of our airways system all require that the Federal Government provide adequate technical and financial assistance to assure that airport capacity will be kept in balance with airway capacity, with the technological developments in aeronautics, and with the air transportation needs of the Nation.

To vastly increase the airways capacity without making provision for equivalent increase in airport capacity, including the passenger, baggage- and cargo-handling facilities, as well as those exclusively for the aircraft, would obviously be folly.

For our system of air transportation to properly serve the Nation, airport capacity must be kept in balance with airway capacity, the technological improvements in the aircraft, and the contemplated increased numbers of passengers, aircraft, mail, and goods.

Third, the air traffic growth in the United States continues unabated. Aircraft operations have quadrupled since 1946 and they are forecast to do the same in the next 10 to 12 years.

The historically conservative Civil Aeronautics Administration predicts that the Nation's airlines will carry 66 million passengers and fly 35 billion passenger-miles by 1960, just 1½ short years away, and approximately double that again by 1970. Aircraft movements are expected to increase to 35 million by 1970.

This growth in airline-passenger transportation has been, and will be, more than matched by other segments of aviation.

In terms of airport facilities, the Curtis report predicts a need for doubling the airport capacity for handling aircraft and says that "ground facilities dealing directly with passengers will require even more spectacular increases in capacity."

Fourth, capital investment needed to bring the airport facilities up to the present and future requirements of the Nation's air transportation system is far beyond the capabilities of the communities to provide without continued substantial help from the Federal Government.

In order to determine the magnitude of the capital investment needs of the Nation's airports, a recent National Airport Survey was conducted which indicated a total of over $1 billion of planned airport development in the next 4 years.

Mr. PLAPINGER. Who conducted that survey?

Mr. BURNARD. That was jointly conducted by the Airport Operators Council, the National Association of State Aviation Officials, and the American Association of Airport Executives.

We did it on a voluntary basis last November and December. These are the results of a national survey on which we got slightly less than 50 percent reply on all the publicly owned airports that are currently now in the National Airport plan.

Mr. PLAPINGER. Was this survey made available to the CAA?

Mr. BURNARD. Yes, the results have been. We put it in the record of the House Interstate and Foreign Commerce Committee at its hearings on S. 3502, as well as in the Senate hearings.

Mr. PLAPINGER. May we have a copy of the survey.

Mr. BURNARD. Yes.

I believe that each Member of the House has received a brochure that was jointly compiled by the three organizations I have just mentioned, and in addition, the American Municipal Association, the United States Conference of Mayors, and the National Association of County Officials—and that includes the same information, but I will make it available for the record here.

(See appendix, exhibit 7, p. 499.)

About half of this, or $521 million, is either on hand or anticipated from local sources and another $68 million is anticipated from State sources, leaving a deficit of $477,285,308.

This $477 million deficit is spread fairly uniformly over the next 4 years with requirements of $102 million to $132 million per year.

We know that the billion-dollar estimate for airport development is conservative not only because it represents numerically fewer than half of the Nation's public airports, but also because many of the requirements for operation of jet aircraft are still unknown and were, therefore, not fully taken into account in these plans.

The heavy demands of population growth has taxed to the limit in many communities the ability to raise large amounts for the schools, streets, hospitals, utilities, and other requirements of our modern civilization, which from the standpoint of the local taxpayer must take precedence over airports. We airport operators do our utmost to put our facilities on a self-supporting basis and seek to assure that the direct users and those benefiting most from the airport pay their reasonable and proportionate share, but it is only by continued, and more substantial contribution from the Federal Government that the necessary capital improvements to airports can be achieved. The unavoidable and sobering fact is that the huge capital outlays required for airport improvements quickly outstrip the revenues they produce and the rapid growth and obsolescence factor in aviation has made impossible the building of reserves for such continued explosive growth.

Thus, it has been and will continue to be a real struggle and sacrifice by local communities to raise the matching funds necessary to obtain the Federal funds which have been available to date. However, the need for additional Federal funds, to provide a national system of airports is clearly evident in the historically substantial excess of requests by communities for Federal aid over the available Federal funds.

In closing, may I reemphasize that the Federal role in aviation should be one of fostering a systems approach to aviation so that we will know in advance that the various components of the system—the aircraft, the airways, the airports—will be planned together. This will assure that the millions and billions of taxpayers' and stockholders' dollars involved will not be unnecessarily jeopardized.

Thank you.

Mr. MEADER. Mr. Burnard, I would like to get into this matter of location of airports and start out by asking whether you agree that in continuing and expanding the Federal aid program for airports, that expansion should be preceded by the systems planning that you mentioned in your concluding paragraph, that it doesn't make sense to go ahead and spend millions and hundreds of millions of dollars on just a kind of hit-or-miss basis or patchwork basis, but that some basic determination should be made, and some standards and criteria set

up which will provide this system of the gearing of the aircraft and the airway and the airport together in one system?

Do you agree with me that such planning and research should precede sizable expenditures by the Federal Government?

Mr. BURNARD. Congressman Meader, I can only partially agree with you. Unfortunately, we can't stop the clock. I think ideally it would be a nice way to do it, but air transportation is moving so fast that we have to use the best tools available to keep up.

Now, there are planning standards developed by the CAA. Unfortunately, many of them are out of date. But I do know that the present staff of the Office of Airports of the CAA, as well as the Airways Modernization Board, are working very hard to try to find answers to some of these problems and update some of the standards.

Much of the need for continued Federal financial participation in airport development is needed for reasons other than the placement of a second runway or the actual building of a new airport.

The fact of the matter is that there are few new major airports being built. Chantilly here in Washington is one of the few. Midcontinent International at Kansas City is another one. Chicago O'Hare, which is pretty well along now, is another one. But few new major airports to serve communities are being built at the present time.

So I would think that we would be handicapping the whole progress of aviation if we were to say that we shouldn't do anything about airport development until we have the best possible set of planning criteria.

We are trying to improve what we have and still keep up.

Mr. MEADER. Let me ask another question. Your primary concern is airports, and that happens to be the reason I originally got interested in this aviation inquiry, as I think perhaps you know, because I have two airports in my area—the Willow Run Airport, which now serves Detroit, and is a terminal for the commercial airlines, and the Detroit Metropolitan Wayne County Airport, it is now called, which is some 8 miles east of Willow Run.

And I have been concerned about the site selected by the county road engineer after the war, and that substantial sums of local and Federal funds have gone into that airport.

I believe you may have been present when the representatives of that airport testified before the House Interstate and Foreign Commerce Committee and indicated in the last 2 years, which is the interval since our previous hearing on aviation, they had spent some $20 million on the airport in total of local, State, and Federal funds, and they estimated that there would be $35 million more required to put that airport in condition.

It seems to me before we go ahead pouring a lot of money into airports, someone should have made a basic determination about the separation of major airports in a terminal complex, and it strikes me that that has not been done.

We have heard some very critical remarks about the advances in airports. Mr. Arnold, for example, of the ATA, testified in our hearings 2 years ago, and we thought it was sufficiently important to quote him on page 7 of our report, and I want to read it to you:

> Milton Arnold, vice president in charge of operations and engineering for the Air Transport Association, a trade association for the scheduled airlines, characterized airport planning as the most backward phase of aviation.

And then we quote Mr. Arnold.

They (CAA) have gone along with the way the wind is blowing, and I don't think they have done any concerted development in airports. I think it is a factual statement that the airports today are further behind in relationship. In other words, our feeling, Mr. Chairman, is the airplane is ahead of the air-traffic control system, and the facilities in the air channel, yet the air-traffic control system is, by far, ahead of our airports. So the weakest link in this, I think, in capacity and operations, is the airport.

Now, the committee went on to say this, and I think I will quote it:

It was apparent years ago that jet aircraft would be used sometime in the future, not alone as a military weapon, but also for commercial air transportation, but the effect of using high-speed aircraft in airport planning is only now receiving the concentrated attention of the Civil Aeronautics Administration.

You referred to criteria, and this appears on page 379 of our hearings of June and July of 1956. Mr. Howell, then the Director of Airports, quoted from the Airport Design Manual, beginning at the bottom of page 11, dealing with the separation of airports, and this is what he quoted from that 1949 document.

The minimum distance between airports for contact operations should be equal to the sum of the radii of their traffic patterns. The radii of airport traffic patterns is as follows: Personal and secondary, 1 mile; feeder, 2 miles; trunk lines and express, 3 miles; continental and larger, 4 miles. Greater separation probably will be required if instrument operations are to be conducted. A study should be made of the existing or potential instrument traffic patterns for airports in the area and adequate separation between the airports should be provided to avoid conflicts in instrument-approach patterns.

Apparently the Civil Aeronautics Administration in 1949 was able to establish criteria, but so far as I know, they have not published anything since 1949, almost 10 years, and certainly have not published anything with respect to the prospective use of jets commercially with respect to the effect of holding and approach patterns of jets upon the separation of major airports in the terminal complex.

Am I correct that there has been no such publication? Are you aware of any?

Mr. BURNARD. Congressman, we share your concern about the lack of progress that has been made by CAA in the field of airport planning, and to my knowledge there is nothing more current in the CAA on this subject than that document to which you referred.

The most current document that I know of is the Curtis report, entitled "Modernizing the National System of Aviation Facilities," in which on page 61 they deal with the subject of spacing between airports.

Mr. MEADER. I didn't get the reference.

Mr. BURNARD. This is part of the Curtis report. That was in five parts, as you may recall.

Mr. MEADER. Yes.

Mr. BURNARD. This one is entitled "Modernizing the National System of Aviation Facilities." And beginning on page 60 there is a subheading called Spacing Between Airports. And it goes on to say that among other things——

Mr. MEADER. Why don't you read it? I think it should be in the record. I don't believe it is.

Mr. BURNARD. Do you want the whole thing read?

Mr. MEADER. That comment.

Mr. BURNARD. I will read enough so that it orients the subject. I am now quoting from page 60:

The location of multiple airports in a metropolitan area will greatly influence their respective capacities. In fact, if airports are located too close together, they can hinder one another to the extent that two airports will have no more capacity during IFR weather than a single airport.

Furthermore, it is desirable to develop one airport site to its maximum potential before constructing another airport. The greater the number of airports, the more complicated is the approach system, which must be utilized.

The general operational criteria for airport location can be summarized as follows:

(*a*) An airport should be developed to its maximum capacity with parallel runways before a second airport is constructed. A second airport, or any others needed, should be located on either side of the first airport with the instrument runways of both airports parallel.

(*b*) The recommended spacing between airports is on the order of 16 miles, although this figure must be finally determined through operational experimentation. Existing airport complexes have lesser spacing between airports and the air-traffic control system must be developed to accommodate these existing complexes. However, where new planning is being undertaken, a separation such as 16 miles is desirable with the understanding that each airport is to be developed on a multiple-runway basis.

(*c*) Airports along the extended center line of the instrument approach to another airport should be avoided, if possible. If built, they should be located about 40 miles away from the existing airport.

(*d*) Airport location must be consistent with the overhead airways traffic pattern and avoid creating unnecessary airspace problems. Traffic flow to and from the airport should be considered and airports located to avoid unnecessary cross-traffic through terminal areas.

Those are the most pertinent sections. It goes on for some length.

Mr. MEADER. That is the Curtis report. The Harding report also had a section on airports in which they were very critical of the planning for airports. They didn't emphasis the matter of separation of major airports in a terminal complex, but they did point out that we were very far behind in our airport pattern and in the design of airports.

Mr. BURNARD. That is right, sir.

Mr. MEADER. Did I get from you that aside from this Curtis report and, of course, I must point out that they did not have the responsibility of the CAA, which does have primary responsibility in this field—you agree with that, don't you?

Mr. BURNARD. Yes, sir.

Mr. MEADER. Are you aware of any studies made by the Civil Aeronautics Administration and any findings and conclusions as to standards or criteria that they have developed looking ahead to the time when jets will be used commercially?

Mr. BURNARD. With respect to airport separation?

Mr. MEADER. That is right.

Mr. BURNARD. Or runway separation. None have come to my attention, Congressman.

Mr. MEADER. Have you followed the jet age planning reports they got out from time to time?

Mr. BURNARD. Yes, I have read them.

Mr. MEADER. I have, too, and I have not been able to find any comments with respect to the separation of airports, major airports, in the terminal complex in the light of the use of jet commercial planes. Have you seen anything that had reference to that in any of the jet age planning reports?

Mr. BURNARD. I have seen nothing in those reports on that subject.

Mr. MEADER. Are you familiar with the testimony given by the CAA representatives here the other day?

Mr. BURNARD. I heard part of it, sir, and I have read the prepared statement by Mr. Pyle.

Mr. MEADER. The only thing Mr. Pyle said about airport separation—do you have his statement? I can find it quicker. I have it. He had one comment to make on airport separation which was something more than we got out of Mr. Lowen, his predecessor, 2 years ago, who wouldn't say anything except they were making a study.

Mr. Pyle said under that topic, which is item 6 in his prepared statement, page 18, this sentence, which I think is some progress.

As the traffic pattern is extended for the larger and faster aircraft, it is necessary that more distance be provided between airports located in a terminal complex.

Two years ago Mr. Lowen promised this committee that the CAA was in the process of making a study which in some 6 months from that time would provide some answers to this matter of separation, and yet last week, when he had the CAA up here, they said they hadn't come up with any answers to that problem other than the general statement that Mr. Pyle has made, and I believe when I asked him particularly when any study was made of airports in the Detroit area on holding and approach patterns of jet airliners, they said, I believe on the 14th of July of this year, they were undertaking a study of the Detroit situation at their laboratories in Indianapolis with their simulator, some simulating system that they have there, and that they were going to have results from that study on the 8th of August.

Are you familiar with that at all?

Mr. BURNARD. I heard the statement made before this committee. I am not familiar with the details of the study, however. That was the first time I had heard the matter mentioned, as a matter of fact.

Mr. WESTLAND. Will the gentleman yield?

Mr. MEADER. Yes.

Mr. WESTLAND. Suppose Detroit wants to build another airport, can they build it where they want to or do they have to come to the CAA and ask permission?

Mr. MEADER. If they want Federal money, they have to come to CAA. If they want to build it with their own money, they can build it anywhere they want to.

Mr. PLAPINGER. Is that true, Mr. Karant?

Mr. MAX KARANT (vice president, Aircraft Owners and Pilots Association). It has to be cleared through the Air Space Panel of the Air Coordinating Committee.

Mr. BURNARD. The use of the airspace has to be cleared through the Federal agencies.

There is no certification process to be gone through.

In some States there may be State regulations which might require State aeronautical commission approval before construction of an airport. There is no licensing requirement of a Federal nature.

Under the proposed Federal Aviation Agency legislation for any major modification of runway layout or construction of any airports, whether Federal funds are involved or not, the people involved would have to at least notify the Administrator of their desires and intentions,

and he, the new Administrator, would be expected to advise with respect to the ramifications on the airspace, if such an airport is built.

Mr. WESTLAND. Generally speaking, you are right. If Detroit wants to build an airport, it can probably go ahead and do it if they use their own money.

Mr. MEADER. I think that is right. That is the way they started this so-called Detroit Metropolitan Wayne County Airport.

They had a little field there without much capacity and they went out and condemned a lot of additional land with the power of eminent domain—the Wayne County Road Commission did—and started to build this airport. They started it with their own money, but it wasn't very long before they were down here asking for Federal money, which they got.

In the 10 years between 1946 and 1956 they got well over half what the State of Michigan got for the building of that airport and it still hasn't been used extensively for commercial air operations.

Basically, Mr. Burnard, it seems to me—I would like to have you agree or disagree with me, and I would like to have your statement and reasons for it, but before the Federal Government embarks on this expanded airport construction program, some of these studies about the future of aviation, with jet planes being used extensively by the airlines and perhaps by other civilian aviation, should be made, so that we don't waste the money.

We don't have enough money that we can throw it away. Why don't we have these plans before we embark on the program?

Don't you agree with me?

Mr. BURNARD. I must answer, as I did before, that I partially agree with you. The Airways Modernization Board already has underway and has nearly completed the taxiway test.

I have in front of me a list of the airport projects which they are currently considering. I don't think they have gotten very far along with any but the taxiway tests.

I notice No. 2 on their list is runways, number, orientation, separation, and configuration. Then they go into things like taxiway configuration, lighting and marking, approach lighting, slant visibility, and runway separation range

I don't see on this list——

Mr. MEADER. We asked them about separation when General Quesada was up here, and somebody in the back row said they would bring it up at the next meeting, and they might undertake a study of separation.

Mr. BURNARD. There is nothing on their list of projects immediately under consideration, but we have asked them to go into such matters as soon as they can.

The most urgent projects, though, are such things as the high-speed turn-off tests, and the parallel runways, in order to make immediately useful the expenditure of funds on existing airports.

Mr. MEADER. It seems to me before you start spending any money on an airport it ought to be located properly with respect to traffic patterns, if you will have to increase hazard or decrease capacity, one or the other, and I think they fit together. Then it seems to me that the best thing is not to start spending money on an airport that is not properly located, and I think you should agree with me.

I can understand that maybe you wouldn't want to because you probably have members in your association that have airports that might be adversely affected by such a proposition.

Mr. BURNARD. Congressman Meader, let me just point out that in places like New York, where there are four important airports, where intense studies have been made by the Port of New York Authority as well as the CAA and the airlines for the best utilization of those airports, taking into account that they physically exist at the moment. As you say, the CAA says that they are making such a study with respect to the Detroit area. I have no idea what the CAA will come up with as a result of that study, but it does seem possible to me, and I know it is true in many metropolitan areas, that all of the airports presently existing can be utilized for one purpose or another.

A certain airport may not be useful for long-haul operations, but it can be useful for short-haul operations.

Mr. MEADER. Wel, I may say with respect to the study and I gather this—and I am making an inference, I admit—but I gather from a statement by the CAA representatives I don't think they are making this study for the purposes of determining whether further funds should be spent developing Detroit Metropolitan Wayne County Airport. I don't think they intend to review that decision which they made some 10 years ago, but they are trying to find out how they can fit the maximum amount of jet traffic into the existing airports. I think that is the purpose of their study.

Mr. PLAPINGER. You would not disagree, Mr. Burnard, that, with respect to future airports, such studies should be made?

Mr. BURNARD. There is no question about it. And that is what we have asked the Airways Modernization Board to do something about.

Mr. MEADER. And you think it is possible for the CAA to come up with some standards on separation similar to the ones they already came up with in 1949, but brought up to date in line with the present and prospective use of faster aircraft in flying?

Mr. BURNARD. I believe it should be possible to develop some criteria which should be useful in planning locations of airports.

Mr. MEADER. Well, I must say you are in disagreement with the Administrator, because he says you have got to look at each case on its own facts and that they cannot come up with any general standards.

Mr. BURNARD. For the ultimate determination of placing an airport, I would agree. But I think it is possible to develop some basic planning criteria in advance, which, after taking into account a given local situation, might have to be modified somewhat to make the local pattern workable. But, in our opinion, there is certainly a need for better planning criteria than exists.

Mr. MEADER. Thank you. I did not mean to monopolize the time, Mr. Westland.

Mr. WESTLAND. No, I have no further questions.

Mr. PLAPINGER. May I ask two questions?

In the Under Secretary of Commerce's statement to the Senate Interstate and Foreign Commerce Committee, as one of the reasons for opposing further extension of the Federal Airport Act, Mr. Rothschild says that airports have come a long way toward self-sufficiency. What is your information on that score, Mr. Burnard?

Mr. BURNARD. I think it is probably correct that they have come a long way, but they still have a long way to go. The whole air

transportation business has grown rapidly and airport revenues have increased—just airline revenues have—but their expenses have also increased vastly. And as I have pointed out in my prepared statement, the explosive growth in this business has created such a terrific demand for capital improvements that any difference between cash intake and cash outgo in the operation of an airport in a given year is absorbed so quickly by trying to continue with the capital developments at the airports that they just disappear. As a matter of fact, there is an official document the Bureau of Census puts out on airport finances—well, community finances generally—called The Compendium of City Government Finances. The last one I have a copy of is in 1956. I think the one for 1957 finances is due probably sometime in the next few months. But in their 1956 compendium, they showed figures on a cash-in cash-out basis of 28 communities, 28 of the largest communities, that own and operate their own airports. That would exclude places like New York where the Port of New York Authority operates the airports as contrasted with the city of New York. Those figures indicated that 27 airports had revenues equal to or exceeding current operating expenses; and they showed capital improvements, capital expenditures, capital outlays, also for the same periods. It is a difficult report, though, from which to draw any conclusions as to whether or not airports are self-sufficient. As a matter of fact, if it proves anything, it proves that they are not, because of the capital expenditures.

Mr. PLAPINGER. Is the debt service included in these statistics?

Mr. BURNARD. It is hard to say. You would have to ask the Bureau of Census. Frankly, I had a telephone conversation with one of the people over there to find out something about this; and they apparently send field people out to the communities and talk to the municipal finance officers and get it on a cash-in cash-out basis. But what they include in their reports, I have no knowledge of.

Mr. PLAPINGER. Have you had any conversations with the CAA in this respect?

Mr. BURNARD. Not as such. I heard the questions asked up here the other day, and I might add that Mr. Rothschild was asked by Senator Monroney during the hearings on S. 3502 in March or April if he could supply the committee with some information to back up his statement. And Mayor Hartsfield, before the House Commerce Committee just this month, pointed out to the committee—well, that committee also asked Mr. Rothschild the same information—Mayor Hartsfield pointed out it had been asked for 2 months earlier by the Senate committee and had not been provided.

Mr. PLAPINGER. We have also asked for that information. (See appendix exhibit 3, p. 466.)

Mr. BURNARD. Yes. So whether they have it or not, I don't know.

Mr. PLAPINGER. There was some reference—you were here yesterday when we questioned General Arnold about curtailment of weather services. Have any of your members brought this matter to your attention?

Mr. BURNARD. No, they have not. It is not as direct a concern to us as it is the aircraft operators. We are concerned to the extent that, if the efficiency of the operation of the airport is decreased, then we would take some interest in it. But it has not been significant enough yet for any of our members to bring it to my personal attention anyway.

Mr. PLAPINGER. You refer on page 3 of your statement to a hostile attitude at times by the Government agency with primary responsibility for carrying out the Federal Airport Act. Can you enlarge on that?

Mr. BURNARD. Hostile to the extent that in 1955 when the present 4-year airport program was being considered by the Congress, the Commerce Department flatly opposed it in both the House and Senate as they have done again this year. In addition, you may recall that the airport program since 1946 has been a pretty vacillating thing. I have in front of me a copy of the hearings before the Senate Commerce Committee of the 84th Congress, 1st session, on S. 1855. On page 68 is a chart that shows the original amount anticipated by the Federal Airport Act of 1946, which is $100 million each year, and the actual amounts which were appropriated under that act. You notice that they never get up to even 50 percent of the anticipated amount, and in 1954 they are down to zero. They were at zero in 1954 because the administration did not ask for any money.

Mr. WESTLAND. Anticipated by whom, Mr. Burnard?

Mr. BURNARD. In the act itself of 1946, it states that $100 million per year——

Mr. PLAPINGER. Appropriations up to $100 million per year may be made.

Mr. BURNARD. Were authorized, yes. Up until 1955 it had to go through the Appropriations Committees of Congress for carrying out; and although the original act said that appropriations up to $100 million were authorized, the Appropriations Committees never authorized more than the amount shown on this graph. And this is, to a large extent, because no more money than that was asked for by the administration.

Mr. WESTLAND. Well, of course, your Appropriations Committee frequently appropriates considerably more than is asked by the administration—and sometimes less. It is within their province.

Mr. BURNARD. Yes, sir. That happened in 1955 when this $22 million was appropriated at the volition of the House Appropriations Committee.

Mr. MEADER. Your comment on hostility and vacillating, lethargic attitude relates only to the aggressiveness with which the Commerce Department has pressed for money from Congress. Is that what you mean?

Mr. BURNARD. That was my explanation in respect to the word "hostility."

Mr. MEADER. After they have gotten the money, you have not found any difficulty dealing with them; have you.

Mr. BURNARD. I think our statement in 1956, which was filed with this committee, included some of the problems we were having under the present 4-year program; and with the parent department not very enthusiastic about the program, we have had the feeling at times that maybe this philosophy is carried down in the administration of the program.

Mr. PLAPINGER. You say on page 5 that "manufacturers have already sought a change in SR 422A because of its unduly long runway requirements," and that "AOC has also protested this regulation." What is SR 422A?

Mr. BURNARD. It is the special regulation promulgated by the Civil Aeronautics Board to determine the certification and performance of turbine engine aircraft. It is a special regulation designed for regulating the certification and performance of the new jets.

Mr. PLAPINGER. Now, how does this affect your operation with respect to runway requirements?

Mr. BURNARD. In this respect, Mr. Plapinger, the runway length is determined by a number of factors, the first one of which is, What does the Federal Government require the airplane to do? And if the airplane, for instance, could be certificated without regard to temperature, then the runway requirements would be different than they are under the regulation SR 422 which requires full temperature accountability. Turbine engine aircraft are very sensitive to temperature; and the hotter the day, the harder it is for it to get off the ground. Therefore, the longer the runway necessary to get it off the ground.

Mr. PLAPINGER. Are you suggesting that the airplane be certified without the temperature requirements?

Mr. BURNARD. We haven't made that suggestion, no.

Mr. PLAPINGER. Then what is the basis for your protest? That is what I do not understand.

Mr. BURNARD. The basis of our protest is that we believe that the airplane should be certified and be required to perform in a manner which will not require excessive runway lengths.

Mr. PLAPINGER. And how do you know that excessive runway lengths are required by the special regulation?

Mr. BURNARD. Our own analysis indicates it will be pretty long, and so does CAA and the manufacturers. The certification requirements—this is a complicated subject, I must say—but the certification requirements are for assuring the safety of the airplane for being able to take off with one engine out. The day-to-day operation of the aircraft is not nearly so critical as the certification requirements. In day-to-day operations, full takeoff loads, for instance, are seldom—the percentage of full takeoff loads is very small to the total takeoffs. And most takeoffs are made with 4 engines operating; whereas, the certification requirements are designed to assure the aircraft will take off with 1 engine out and still take off safely. But the way this affects us is that, if the requirements for certification of the airplane are such that it must get up and get off the runway in a shorter length, that can be done by the manufacturer. It's hard to do and it's expensive, but it can be done by making the powerplant more powerful; change the lift, the characteristics of the wings, including such things as jet flap and so forth. One operator, for instance, of the jets changed his order from the J–57 engine, which is the less powerful version, to the J–75 version. Well, he automatically eliminated a lot of his airlines' runway problems by putting a higher powered engine into the airplane.

Mr. MEADER. That is certainly a demonstration of your proposition that this is a system affair. The question is whether you are going to put the expenditure on the ground or whether you are going to put it on the operator and the airplane manufacturer.

Mr. BURNARD. That is correct, sir. The benefits of technological development in the airplane can be shared; but each interest would like to get the lion's share of the benefit. For instance, as more power-

ful engines are developed, and more efficient wings are developed, this means to the airline operator that he can carry more payload. It may at the same time mean to the airport operator, though, longer runways. But somewhere in between, a balance can be struck between not continually extending the runway but maybe not carrying quite as much payload. It is an economic balance which is a fine and a difficult one to determine.

Mr. MEADER. You don't suppose that, since the Civil Aeronautics Board does have some responsibility for the operators and no responsibility for the airports, that they would be inclined to balance on the side of the operators and the manufacturers and against the airports, do you?

Mr. BURNARD. We pointed out in our letter to the Board on SR 422, that we thought they appeared to have failed to take into account the effect on the taxpayers and the airport operators of the certification of operation of the jets.

Mr. PLAPINGER. Was this regulation subject to the normal procedures of the Administrative Procedures Act?

Mr. BURNARD. Yes, sir; it was.

Mr. WESTLAND. This is a lot like building an automobile and then build highways to accommodate the automobile. I mean it isn't put out a one-way street and then say, "Build an automobile to fit the road." And it is the same way with the airplane. They have built the airplane and now put a platform out there for it to land on and take off from. It seems to me that is having the horse in front of the cart rather than the reverse.

It probably makes it tougher for you.

Mr. BURNARD. Yes; it does.

Mr. WESTLAND. But the highway system is much on the same basis.

Mr. BURNARD. There are many similar problems, and our basic philosophy is not to stymie all progress in aviation and say, "Well, now, here's an airport; never build an airplane that won't fit that." But what we do say is, "If you're thinking about building a new airplane, let us in on what you are talking about and let's see if we can't fit the ground facilities to the airplane to the benefit of all; but don't let's wait and bring a plane out and say, all of a sudden, we must change all our ground facilities and air traffic control system, etc., to fit the airplane."

Mr. PLAPINGER. Well, then, is your complaint not with the aircraft manufacturers but rather with the CAA at that stage?

Mr. BURNARD. I don't know that you'd call it a complaint; it is a basic deficiency in our overall aviation planning in this country. It is a dynamic industry. The aviation designers and builders in private enterprise are building the best aerodynamically conceived vehicles. They have done a wonderful job; there is no question about that. The airline operators have been dynamic and have served a very useful purpose and try, as good businessmen should, to make the vehicle pay. We as ground-facility providers have in our own way tried to provide the best facilities to make the operation of the airport most efficient. But, frankly, it gets a little difficult when we are told on a sunny October morning in 1955 that airplanes twice as big as anything we have seen heretofore, which may require runways half again as long and may require them half again as strong, are

going to be dropped in our laps in 1958 or 1959 with no advance planning or coordination on the subject.

Mr. MEADER. Well, that is where I would like to get into the act with the Civil Aeronautics Administration. What did they know about the design of the aircraft and their requirements for airports, and how did they gear that into their expenditure of this—what is it, 4 times 63?

Mr. BURNARD. The present program?

Mr. MEADER. Yes; a quarter of a billion dollars?

Mr. PLAPINGER. Two-hundred-some-odd million.

Mr. MEADER. Did the CAA, in your judgment—were they alert to these developments and did they in their allocation of airport-aid funds encourage the construction of airports to meet the jets?

Mr. BURNARD. Frankly, we feel that a far better job could have been done.

Mr. PLAPINGER. Do I properly conclude from your testimony that you do not in the foreseeable future see an end to Federal Airport Aid?

Mr. BURNARD. I visualize that it is something like the subsidy of the air carriers, or the railroads or the steamships, for that matter, or inland-waterway system. In the air-carrier field, the trunk carriers, I believe, are all off subsidy at the present time. But how long it is going to be necessary to subsidize local service carriers or international carriers who serve purposes other than purely civil transport remains to be seen. My guess is that for some airports it will continue for an indefinite period.

Mr. PLAPINGER. I am interested because Mr. Curtis, whose report you have referred to a number of times, states on page 35 of the final report that—

> consistent with the progress toward self-sufficiency, the Federal Government should reasonably look forward to the eventual curtailment of direct financial participation in airport construction.

Mr. BURNARD. I can agree with him at least to this extent, that——

Mr. PLAPINGER. You can agree with this statement and really not get yourself in hot water, Mr. Burnard.

Mr. BURNARD. In the airport field, we are having a tremendous task of catching airport development up with the progress of air transportation since the end of the war. It has just moved so fast, the demands have been so great, that we are trying to get the airport development on a level with the air transportation system. My personal feeling is that, once we can get that main impetus going so that we can get the airports up to a level comparable with the developments of the air transportation system as a whole, then we are going to be in a far better position to maintain it by ourselves without Federal participation.

Mr. WESTLAND. Now, you have made—I believe it is in your statement here, or perhaps the Department of Commerce prognostication of quadrupling air traffic within the next 10 years, or something like that. Is your organization making plans today for additional airport facilities, or are communities doing it? What is going on in that field? I mean, if this committee were holding hearings 10 years from now, would we again be looking back as to what had happened or are you looking ahead as to what is going to happen?

Mr. BURNARD. Yes, Congressman, each of our members, to the best of my knowledge, has a master plan for airport facilities in the community, to serve the community. Those plans are a combination of details needed to give to the CAA with respect to Federal aid but they are also in most cases made by independent consulting outfits which have been hired by the city to help them in their long-range planning. Most of those plans indicate when the present facilities are likely to be saturated, based upon the best forecasts available to us today. And most major metropolitan areas are making plans or have already made plans for where they go when this airport is saturated——

Mr. WESTLAND. In other words, it is up to the local communities pretty much to do their planning.

Mr. BURNARD. It is definitely their responsibility, but the effectiveness of their planning depends upon the authoritativeness and reliability of the information they can get from Federal sources, national sources, where the overall picture is being planned.

Mr. WESTLAND. Would it not be correct to say that the Department of Commerce, the CAB, has in effect given them a 10-year lead time?

Mr. BURNARD. It is only to the extent of the broadest figures. What Seattle should do or what Detroit should do or what Podunk should do is hard to figure out from those broad figures. Now, the Airways Modernization Board, as I understand it, has just let a contract with an outfit in Chicago, I guess it is—Booz, Allen & Hamilton—the purpose of which is to refine these forecast figures for specific locations.

Mr. PLAPINGER. This is a management consulting firm; is it not?

Mr. BURNARD. That is correct; it is a management consulting firm. But during the Curtis reporting era, they provided through another consulting outfit the same type of information as of 1956, I guess it was. The contract has just been let, as I understand it. It is designed to bring the Curtis information up to date and to furnish procedures for making possible the Airways Modernization Board continuing to keep it up to date in the future. And if that project comes out as successfully as we would like to see it come out, then it will aid materially.

Mr. WESTLAND. Do you think the Airways Modernization Board might go to Detroit, for example, and tell the city fathers there, "Now, look, you'd better get busy and start building another airport?"

Mr. BURNARD. I am not sure they do it quite that way. They provide the basic facts with which the local communities could develop their long-range plans.

Mr. MEADER. As a matter of fact, the local airport operator would not have access to information about holding and approach patterns and air routes that only the Civil Aeronautics Administration would have; isn't that correct?

Mr. BURNARD. That is correct, and that is why I tried to emphasize a little earlier that this whole business requires a great deal of coordination and we need most of all a central coordinating point. At the moment, under our organizational structure, that is the Civil Aeronautics Administration. In the future, if the FAA is established, it will be the FAA. And we would like to see this aspect of both the CAA's functions and ultimately the FAA's functions strengthened considerably over what it has been in the past. As I say here, many taxpayers' dollars will be saved if a better job is done in planning.

Mr. PLAPINGER. What contact has the Airport Operators Council had with the Airways Modernization Board?

Mr. BURNARD. I am not sure what you mean by "contact."

Mr. PLAPINGER. Have you made any representations to the Airways Modernization Board to the effect that "X is an area where we need research; will you do it?"

Mr. BURNARD. We have done it in several ways. As I said earlier, we gave the Curtis committee a full report on what we felt was needed in this field. We have had discussions with Mr. Quesada and his staff on this matter; and, as a matter of fact, one of our people assisted in the development of some of the specific projects they are working on right now. It was at our specific request that they got going on those high-speed taxiway tests which they did last fall. We went down to see Mr. Quesada last September and pointed out to him how critical this was; and, at his request, we made a quick survey and found over $200 million worth of concrete was going down in 24 months among our members. And one of the things they needed to know was how to build the high-speed taxiways.

Mr. PLAPINGER. Wouldn't this more properly be within the jurisdiction of the CAA?

Mr. BURNARD. The CAA has done work on high-speed taxiway tests, but it has never pulled together all the facts available and it has never been done on what you would call an honest-to-goodness scientific basis by actually running airplanes down a runway and finding out how fast they can turn off.

Mr. PLAPINGER. Have you ever sat down with the Civil Aeronautics Administrator and said, "Here are the areas of deficiency. What can you do about it?"

Mr. BURNARD. I guess we have not done it precisely that way; but in one way or another, we have certainly discussed the matter with the Office of Airports Head, the Administrator, and the Deputy Administrator. We have pointed out what we considered deficiencies in the area. We have never actually put down on one piece of paper, "These are the areas we think you should do a better job in. Will you please start?"

Mr. PLAPINGER. I have nothing further.

Mr. MEADER. Any further questions?

Mr. WESTLAND. No.

Mr. MEADER. I would like to tell you how much the committee appreciates your contribution to these hearings, and we appreciate the courtesy extended in your delaying here an extra day to appear before the committee.

Mr. BURNARD. Thank you, sir; and we appreciate the opportunity of telling you some of our problems.

Mr. MEADER. Our next witness will be Mr. Max Karant, vice president, Aircraft Owners & Pilots Association.

Mr. KARANT. What is my deadline, Mr. Chairman?

Mr. MEADER. We will probably have a quorum call, but maybe we can continue on.

STATEMENT OF MAX KARANT, VICE PRESIDENT, AIRCRAFT OWNERS & PILOTS ASSOCIATION

Mr. KARANT. I appreciate being given the opportunity to appear before your committee to discuss the VORTAC situation, and aviation safety—I should add airports in here as well—all matters of the greatest concern to the Aircraft Owners & Pilots Association, AOPA, and our segment of civil aviation, which is known as general aviation, or private flying. As some of you may recall, we have been intimately involved in these matters for several years and have appeared before congressional groups several times. I would like to add here that, at the present time, our organization has 70,000 members, about 50,000 of whom own their own aircraft.

You may be interested in my qualifications to appear before your committee today. I have been an active civilian pilot for more years than I care to admit. I also have been an aircraft owner for many years and presently own an aircraft which I keep at Washington National Airport and which I fly regularly and frequently from that airport. I also am rated by the CAA as qualified to uy multiengined aircraft and to fly aircraft on instruments. In the course of my rather extensive flying, I use all of the facilities currently available in the Federal airways system. I regularly fly both domestically and internationally, and am well aware of the problems and requirements for both types of flying.

Because I will discuss the VORTAC matter first, let me qualify myself on that score. AOPA was a member of the original VORTAC committee which spent a substantial part of the year 1954 meeting in secrecy, attempting to resolve the very serious conflict brought about by the secret actions of the military in committing substantial amounts of Federal funds to a system called TACAN—a system that ultimately undermined the already established civil system known as VOR/DME. You will hear these words come popping up with all these initials, and I will try to interpret them as I go along. The first use of the word "VORTAC" applies to a committee, which is not yet a system. They took the name of the committee and made it into a system.

Mr. MEADER. Mr. Karant, while you have interrupted your reading, how long have you been representing this organization?

Mr. KARANT. Ten years now.

As I say, this committee met in complete secrecy because of the classified nature of TACAN. Membership on the committee included all major civil and military users of the airspace and the radio navigation system. Civil representation included, in addition to AOPA, the National Business Aircraft Association, the Civil Aeronautics Administration, and the Air Transport Association, representing the scheduled airline companies. General Arnold, ATA vice president, was chairman of the VORTAC committee. Chief military spokesman was James T. Pyle, then with the Navy Department and now CAA Administrator.

As is now well known, the vote of the VORTAC committee was 4 to 3 in favor of forcing TACAN on civil aviation, and junking a valuable and operating portion of the existing civil system. Only one civilian group voted with the military—the Air Transport Association.

So we are today on the horns of what is probably the costliest dilemma any of us in aviation will live to see in our generation. Back in 1955 it was well established on the record that we were talking about a matter of $483,125,000 for TACAN. Even at that time, 3 years ago, TACAN had already begun to cost the American taxpayers 45 times more than the United States originally paid for Alaska.

Needless to say, we feel strongly that an accurate accounting of the present cost of TACAN should be made to the public.

TACAN's full story comprises a voluminous history, and need not be reviewed here. It is sufficient to say that all this resulted in the so-called compromise between the civil and military agencies of the Government. The hybrid born of that unhappy union was named VORTAC—the entire military system, and one-half of the civil system.

Throughout the period which preceded this birth, AOPA repeatedly expressed grave concern over what this entire fiasco was doing, and would further do, to the public purse. We expressed our astonishment over the liberties being taken with public funds and the public trust, in buying a fantastically costly system that existed only on paper, had never been proved even experimentally, but which justified its existence solely on the say-so of apparently unchallengeable officials of the Department of Defense.

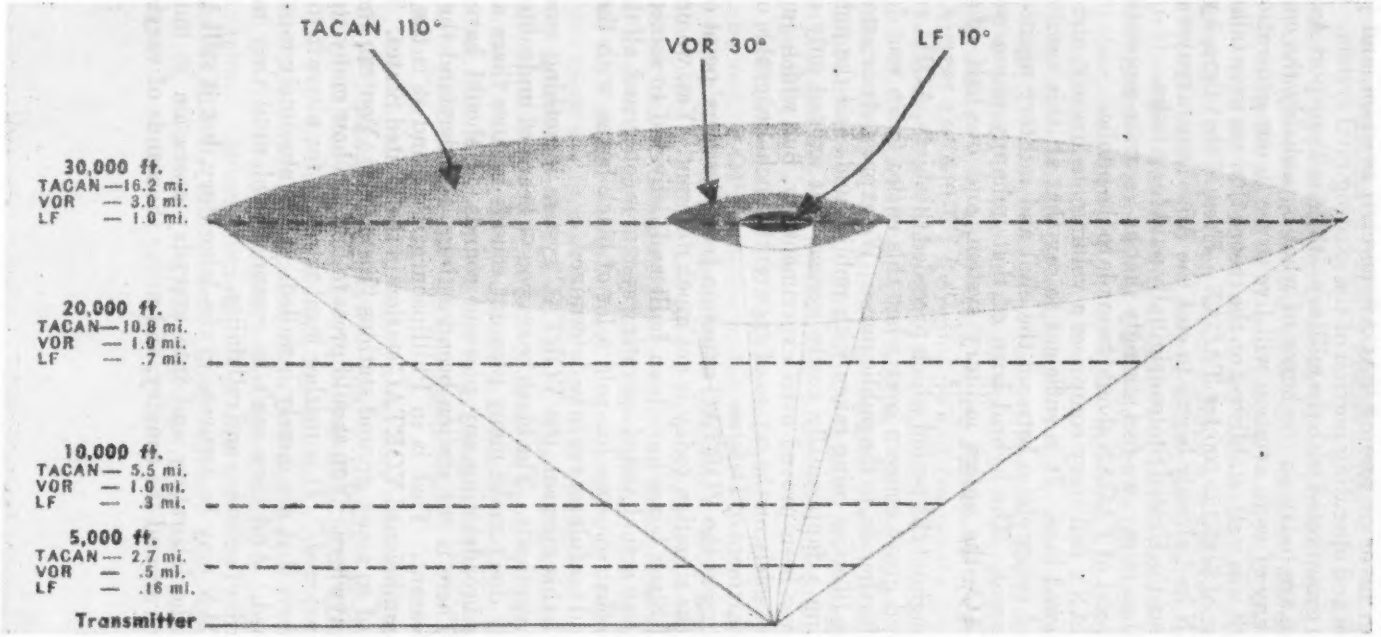
Looking at the VORTAC situation from the users' point of view as we do, the situation today is not much different. Yes, we understand a lot of black boxes have been built and delivered to someone. But so far as an actual, tested operating system is concerned, all this proves to us is that someone has sold a lot of black boxes, with their actual value and usefulness yet to be determined.

As of this moment, the VORTAC system is nothing more than a costly hypothesis. The black boxes you've heard of undoubtedly exist, but they don't make many pleasant sounds because there aren't any stations broadcasting any pleasant sounds. I should have changed that. There is one station broadcasting. I understand the sound is now pleasant. That is in Phillipsburg, Pa.; and it is the first and only commissioned VORTAC station in the United States. The CAA speaks of so many ground stations "installed." You can install anything anywhere. You should press to find out how many stations are "commissioned." It is neither legal nor safe for aircraft to navigate on stations that are merely installed. They absolutely must be commissioned. And they can't be commissioned until they meet rigid standards of accuracy and reliability.

TACAN may be accurate in the laboratory, but it still has to get out of the laboratory and into everyday operation in hundreds of locations around the country, and under thousands of varying conditions.

(The following was supplied for the record:)

[From the October 1957 issue of the AOPA Pilot, official magazine of the Aircraft Owners & Pilots Association, Washington, D. C.]



Cones of confusion: The above illustration compares, in miles, the width of cones above TACAN, VOR, and LF radio navigation transmitters at different altitudes. Aircraft cannot use station's emissions while flying in the transmitter's "cone of silence."

Broad Cones Unusable As Position Fixes

TACAN's broad "cone of confusion" (110°), the area or cone over a radio facility where impulses are not received by aircraft using the beam, may not be suited for air traffic control holding purposes, fixes or reporting points, but its hugeness may be used by VORTAC proponents in their attempts to justify the DME (distance measuring equipment) portion of the military-developed, tactical navigation system.

From discussions taking place recently in special working group 21 of the Federal Air Coordinating Committee, justification for DME—for which civil aviation says it has no requirement—seems to be shaping up like this:

Since the cone of confusion over TACAN stations is so great that it cannot be used for ordinary air traffic control purposes, DME, which is not affected by this cone, is needed for holding purposes and to provide fixes and reporting points.

This reasoning, of course, does not take into account the fact that aircraft must have expensive equipment to perform some of the services the VOR (omni) receiver now provides.

VOR has a cone of confusion of 30° which the Civil Aeronautics Administration contended until recently was the maximum allowable if satisfactory performance was to be obtained. Low frequency range stations have a cone of 10°. The illustration on this page gives a graphic comparison of the TACAN, VOR, and LF cones at different altitudes.

In a paper dated May 10, 1957, and filed with the ACC, the CAA gave its version of air traffic control requirements as they relate to the cone of confusion over transmitting stations. The CAA paper said:

"The cone or area over a facility, where reliable track guidance does not exist, should be kept as small as possible, and in no event exceed 30°."

After receiving this CAA paper, which discussed the problems involved in switching over from the present VOR–DME navigation system to VORTAC, the ACC set up special working group 21 to iron out problems raised by the CAA. At about the same time, an Air Navigation Development Board (ANDB) development contract was awarded Arma division of American Bosch-Arma Corp., through CAA's Technical Development Center at Indianapolis, Ind., in an effort to bring the 110° TACAN cone of confusion down to 60°—still twice that of VOR's 30°.

Sixty Degree Cone Sought

With the letting of this contract, CAA revised its approach toward the stated 30° requirement. The Federal agency proposed that the following be substituted for the cone of confusion paragraph in the May 10 paper:

"It is essential that the cone or area over the facility where reliable azimuth signal does not exist be kept as small as possible. At the present time, as the reult of a completed antenna development program, the cone of a VOR with a 4-loop antenna array has been reduced to 30°. The present TACAN cone is 110°; however, an ANDB-sponsored development contract for an improved TACAN antenna, to reduce the size of the TACAN cone to 60° is being handled by the CAA–TDC at Indianapolis. For planning purposes, *a 60° cone should be considered as applicable to the TACAN portion of VORTAC.*" [The italics are ours.—Ed.]

With a 60° cone still too broad to be used for air traffic control purposes, air traffic control experts have expressed the opinion that every pilot operating on the airways under ATC rules in 1965 will be required to have DME in his plane—not only for distance measuring purposes, but to provide fixes and reporting points, and for holding purposes. (Segregated traffic on the airways would become effective in 1965 under a plan endorsed by the White House air navigation planning group recently.)

As the situation now stands, there is no civil requirement for the DME portion of TACAN. (See article on p. 82a.) At the August meetings of special working group 21 an effort was made to delete a requirement for DME in the group's report. This move was opposed by the United States Air Force, Army, Navy, and CAA. AOPA, the Air Transport Association, and the National Business Aircraft Association will file minority reports opposing the imposition of this requirement on civil users.

An idea of the extent of the interference the 110° TACAN cone of confusion on orderly air traffic control procedures may be gained from the table on this page and illustration on page 82c.

At an altitude of 1,000 feet above the terrain, for example, the diameter of the TACAN cone is more than one-half mile (0.54 mile, to be exact), while the VOR cone is one-tenth mile, or 172 yards. At 100,000 feet, where some supersonic jets are expected to be flying in the future, the TACAN cone is 54 miles. It would take a 1,200 miles per hour jet 2.7 minutes to cross this silent area. The same jet could cross the 10-mile VOR cone in 30 seconds.

At intermediate and low altitudes, and at comparatively slower speeds, the diameter of cones of confusion is of immediate importance, not only because a plane flying across one must do so on dead reckoning if it is following the beam of that particular station, but also because of the wide area where the emissions cannot be used for air traffic control purposes.

A plane traveling at 300 miles per hour at 30,000 feet requires 3 minutes, 12 seconds, to cross the 16.2-mile TACAN cone, compared to 36 seconds required for the negotiating of the 3-mile VOR silent area. At 10,000 feet the TACAN cone is 5.5 miles in diameter and requires 2 minutes, 42 seconds, to cross while traveling at 120 miles per hour. At the same altitude and speed, VOR's 1-mile cone requires 30 seconds to cross.

Roughly, the time required for an airplane to cross a TACAN cone of confusion is five times greater than that required for the comparable VOR area. The time ratio between TACAN and LF is about 16 to 1.

Time required to cross "cones of confusion" at various altitudes at appropriate speeds

Altitude (feet)	Diameter of cone (statute miles)	Speed (statute miles)	TACAN	VOR	LF
	Miles	*Miles per hour*	*Minutes*	*Seconds*	*Seconds*
100,000	TACAN 54 VOR 10 LF 3.3	1,200	2.7	30	10
50,000	TACAN 27 VOR 5 LF 1.6	600	2.7	30	10
30,000	TACAN 16.2 VOR 3 LF 1	300	3.2	36	12
20,000	TACAN 10.8 VOR 2 LF .7	300	2.2	24	8
10,000	TACAN 5.5 VOR 1 LF .3	120	2.7	30	10
5,000	TACAN 2.7 VOR .5 LF .16	120	1.5	15	5
			Seconds		
1,000	TACAN .54 VOR .1 LF .03	120	16.0	3	1

Mr. KARANT. It is our understanding that, so far as reliability is concerned, TACAN is flatly unacceptable to any segment of civil aviation, even in its present form.

Back in the earliest stages of the secret VORTAC committee in 1954, it was my personal conviction that this entire business needed the urgent investigation and evaluation by the highest echelons of our Government. AOPA recommended several times that the Bureau of the Budget, General Accounting Office—Congress itself—take a very critical look at a secret program that now looks like it may even hit a billion dollars before it ever becomes a "system" in anything more than theory.

As you also probably will recall, a subcommittee of the House also recommended such an investigation, and further recommended that these tremendous expenditures of public funds be immediately suspended until such an investigation could be made.

Nothing ever came of these recommendations. We feel that such investigation is needed today, even more than before, because the

price is going up all the time. Besides, many questions as to the validity of the VORTAC system itself have never been answered.

The hardships brought about by the TACAN portion of VORTAC are being hammered home to those of us who fly more and more every day. Large numbers of existing VOR stations are at this moment shut down throughout the country. They are being converted to VORTAC's, a process that takes anywhere from 1 to 3 months. This means that even our existing and vitally important VOR stations, which the military promised us we could have, are being taken away from us in ever-increasing numbers over long periods of time, while they are being converted to a system that has yet to work safely and reliably. At this moment, just one VORTAC station has been commissioned; and this station was considered safe only 36 days ago, at Phillipsburg, Pa.

You have heard that the United States is staging a VORTAC symposium in October to acquaint other countries with our program. One of the most serious problems the United States faces in this forthcoming international sales convention at Washington and Indianapolis is to get just a few VORTAC stations on the air in the Indianapolis area with which they can demonstrate how the system works. If they just get some stations on the air, they will have accomplished a commendable feat. We'd be amazed if they get one of them commissioned in time.

It is here, in the international arena, that we face another serious reversal. When the United States violated its international civil agreements with the VORTAC decision, many other countries expressed their objections, in a number of ways. This problem will probably reach its climax in Montreal in February, when the International Civil Aviation Organization meets to reconsider the whole matter of short-range navigation aids—which is just another way of saying "the VORTAC problem." That is why the United States is putting on the special show for experts from all these countries in Washington and Indianapolis in October.

Once again, however, we find ourselves threatened with competitive short-range systems. This threat had originally been eliminated with the VOR/DME international agreement years ago. Now, however, the British, for example, are making no bones about reopening their original position in favor of Decca—ironically, an American invention. Decca can give the airplane both azimuth and distance information. And this is what you get from VORTAC and VOR/DME. It not only can; it does in many parts of Europe. It is in wide use by not only aircraft but ships as well.

Let me add here at the moment that it is used by aircraft and ships and they all use the same system. There is no duplication involved here. A ship can put the receiver in and use it the same as the airplane uses it, and the airplane can put the receiver in and use it the same as the ship uses it, for navigation purposes. And this is another big selling point. A mere handful of comparatively inexpensive ground stations supply this service to any ships or aircraft within a very large geographical area. They could do the same in the United States at a cost that would be a mere fraction of the cost of TACAN or VORTAC. And Decca is getting a foothold in this part of the world. There is an experimental system in New York, because helicopters

can't use the VORTAC but can do very well with Decca, as they have been doing for some time in Europe.

Mr. WESTLAND. Has this Decca any relationship to Loran?

Mr. KARANT. I think loran would be called technically a hyperbolic system, and to this extent Decca is a hyperbolic system as well. But that is the only relationship they have.

We say this only to point out that our international position, now that we have violated our original agreements, faces a real and practical threat. All of us in the United States now must fight in every way we know for the retention of VOR as the international standard azimuth aid. United States civil aviation, but only United States civil aviation, is very deeply committed to VOR. General aviation uses more airborne VOR equipment than all other users combined. The airlines are completely equipped. Even our military admitted that they bought something like 25,000 airborne VOR receivers.

I'm sorry I have taken so much time on this one subject. As you can see, we regard it with the utmost gravity. All civil aviation is being penalized by this program, and safety is being compromised. Unless some high level of our Government will act to clear the atmosphere on this whole subject, these penalties and hazards will continue indefinitely.

Mr. MEADER. Mr. Karant, this decision was made in August of 1956, was it not?

Mr. KARANT. That was the Air Coordinating Committee decision, yes, sir.

Mr. MEADER. I mean as the foundation for VORTAC system.

Mr. KARANT. In 1956 it was finally decided that we would compromise in this manner. That was then named at that time. It was named VORTAC. That is where the name came from.

Mr. MEADER. Well, now, are you recommending that we reverse that decision and go back to VOR or what?

Mr. KARANT. This is possible. I would recommend that some responsible Government agency that is immune to military pressures look at the whole picture and get all the information behind the scenes which we don't have and find out to what extent this is implemented, really, to what extent it is really needed to be used by the military, because the military are the only people who have ever said they had any requirement for it.

Mr. PLAPINGER. Was this ever challenged by anybody?

Mr. KARANT. Oh, we tried many times; but you can't challenge the military. They say, "We are defending your country," so what do you do? After you have determined this, only then, I believe, could a decision be reached as to whether or not at this stage of the game it would be economical to stop what you are doing—not throwing any more good money after bad—or go ahead. Maybe it has been developed to the point where you can go ahead safely. But at the present time in general aviation, we have no requirement whatever for it. It is nothing but a hardship on us. The airlines have vacillated back and forth because they——

Mr. PLAPINGER. What is nothing but a hardship?

Mr. KARANT. The VORTAC decision gains nothing for us. We lose by it. I'd say at the moment we have been set back a minimum of 10 years for getting a common system of the type that was visualized when the original VOR–DME decision was made.

Mr. PLAPINGER. Don't you think reversing the VORTAC decision would set aviation back 10 years?

Mr. KARANT. It depends on what you mean by "aviation." If it would set the miiltary back 10 years, I'd say we could not do that. But somebody has got to find out whether it is true. But at the same time, the military are very enthusiastic about self-contained navigation aids. They don't refer to TACAN at all these days.

Mr. PLAPINGER. You are not suggesting they have no further use——

Mr. KARANT. I am suggesting they might, and I am suggesting somebody in the United States Government ought to really find out.

Mr. PLAPINGER. And you are suggesting it was not really found out when the VORTAC decision was made?

Mr. KARANT. The position that was taken for us, really, in the original VORTAC committee, the one that met in secret, was that the military have stated their requirements and it is not for us to question this at all. There was no further effort made on this at all. The only justification that was given us was that the Navy had difficulty in getting aircraft back aboard aircraft carriers with the system they had in use at the time, and the Navy originally asked that a device of this kind be developed for their use on aircraft carriers. As a matter of fact, the original concept of the Navy was that it would not be imposed on anybody else. But the Air Force moved in and took it over, and then we all had it.

Mr. PLAPINGER. Wasn't there an international agreement on the use of DME?

Mr. KARANT. Yes, it was agreed to.

Mr. PLAPINGER. Wasn't it the decision that VOR would be the international system and it was understood that the United States would develop some distance measuring equipment, not specifically DME?

Mr. KARANT. I don't know how that was spelled out. I know the destruction of the civil DME, that all by itself, did create most of this controversy overseas, virtually all of it. As you know, the NATO countries presumably had agreed to TACAN.

Mr. PLAPINGER. Well, the military planes, they are using it?

Mr. KARANT. I don't know whether they are or not. I don't have this information. But the very countries that agreed in NATO presumably to take TACAN, reversed themselves when their representatives arrived at—the International Civil Aviation Organization in Montreal. It is a very serious problem and, come February, I think we are going to have a real fight.

Mr. MEADER. Mr. Karant, do you cover in your statement anywhere the costs to the business aircraft owner in installing the equipment in his plane to take advantage of the VORTAC system when it does operate?

Mr. KARANT. No, sir; we have no idea what it will be. Before this decision was made, there was distance measuring available, which is the key to this problem. There was distance measuring equipment developed and being sold. As a matter of fact, general aviation aircraft are the only ones that really used DME back when this fight staterd. There was also in development and almost in the test stage——

Mr. MEADER. Now, what does that equipment cost?

Mr. KARANT. That equipment at that time was developed to airline standards. In other words, type certificated. You could go to 90,000

feet and 70° below zero. All this sort of thing you don't need in general aviation. That equipment cost $5,000 apiece. Much too high. The average man couldn't buy this. But the same company had in development what they called a poor man's DME and was almost up to the production stage. When this blow hit, they junked it. That one would have cost just a little over a thousand dollars apiece. Now we have nothing.

Mr. MEADER. Is that just the distance measuring information? It doesn't give you the VOR?

Mr. KARANT. No.

Mr. PLAPINGER. Do you have the VOR—members of your group? How many AOPA members have VOR?

Mr. KARANT. For those who fly cross country, I'd say the great majority. I'm guessing. At the present time there are 85,000 airborne radio equipments of all kinds in our aircraft. These include the VOR's. VOR's are the most commonly used navigation device that we have.

Mr. MEADER. What does that cost—as you say, the poor man's VOR?

Mr. KARANT. Well, we will see how poor you are, now. The model I have, which is reliable and accurate enough to be used for instrument flying—this is not the poor man's VOR; this is a sort of poor man's VOR—this one costs about $1,200 installed in the aircraft. This includes installation cost. Now, there is a poor man's VOR for flying on days like this, just for elementary navigation and communication service, which is about $500.

Mr. MEADER. Installed?

Mr. KARANT. Yes.

Mr. PLAPINGER. Didn't the Air Coordinating Committee realize when it made its decision that it would take several years to iron out bugs in this equipment as it does for most electronic equipment?

Mr. KARANT. Yes.

Mr. PLAPINGER. What new has occurred since 1956 when this decision was made, to indicate that the decision should be reversed?

Mr. KARANT. In the first place, the promises that were made have not materialized at all. We were told that this was the greatest invention since the ice-cream cone, and it turned out not to be. We were told, for example, we could have this system operating; all we had to do was pat them on the back and say, "Let her rip." I think one general told us in 18 months.

Mr. PLAPINGER. General Bergquist told us that in our hearings in 1956. Incidentally, General Arnold told us yesterday that two of the larger airlines have ordered DME, one for all of its planes in the fleet.

Mr. KARANT. Yes, I understand this. I watch the ATA position with fascination. I don't understand how they do this, but the basic pitch is that they're trying to avoid user charges. That is the first thing.

Then they say—General Arnold sticks pretty well to what the military position was, and that was that we cannot challenge these people. If they say they must have it, they—and we—must have it. The airlines do not have a requirement. And I believe you had discussions in this room as to what was the meaning of the word "requirement," whether it is legal, moral, or something. We have a requirement because we need to measure distance, but they don't use the term that way. Their contention is, I believe, that it means they absolutely must

have it, and therefore they are willing to pay for it. Therefore, if they aren't willing to pay for it they have no requirement.

Mr. MEADER. When you say "they"—are you referring to the military or airlines?

Mr. KARANT. Airlines. Now, we have said several times we have a requirement for distance measuring; and if there are going to be user charges, as long as they are fair and equitable and comparable to user charges to people who use Government highway and waterway facilities, we are willing to pay them. We have had a requirement for DME for a long time. And, as I said just a moment ago, we have been set back 10 years. I don't know when we will ever see a DME—the new TACAN which they call DMET, just to further confuse you.

Mr. PLAPINGER. Don't you think we are going to be set back another 10 years if we come in and start reevaluating the VORTAC/DME situation? This is not going to be done overnight.

Mr. KARANT. All I can say is that today you do not have a system, and somebody in this Government should find out why not.

Mr. PLAPINGER. There was a timetable set for implementation of the VORTAC decision in 1956. We are told they are now right on schedule. Is there any reason to question that?

Mr. KARANT. Yes. So far as we know, this equipment is not performing in the manner they represented that it would perform. And, secondly, there is no provision made whatever in this development program to take care of the vast majority of the civil aircraft that have a need for this, for distance measuring.

Mr. PLAPINGER. You say you have a requirement in the sense that there is need for this?

Mr. KARANT. Yes. Didn't you have a witness here the other day who said that there is a general aviation TACAN/DME in development? I believe you had somebody in here. This came as a surprise. We can't find a record of such a development of any sort.

Mr. PLAPINGER. I am not sure but what Mr. Tippetts didn't say that, but I can't recall.

Mr. KARANT. So far as we have determined, there is none. And the companies that supply the aircraft with the equipment they need say flatly they will have no truck with this at all until they see the system working. So we have just to sit back and wait and see how long it is going to be.

Shall I go on?

Mr. PLAPINGER. Yes.

Mr. KARANT. Now, we should like to turn to the matter of aviation safety. First, let me give you a few figures that might help you evaluate the comments that follow. These figures are from our IBM department, which maintains a complete and current file of the total registered United States civil aircraft. This file is a duplicate of the CAA's own records. Now, I won't read that table, but you will see what types of aircraft will be seen by whom.

These figures may also interest you. Company-owned aircraft, including the airlines, total 27,307, or 29 percent of the total. This includes, incidentally, irregular air carriers. Individually owned aircraft total 60,286, or 64.1 percent. There are 8,890, or 9.5 percent, multiengined aircraft in use, the great majority, about 80 percent, of which are nonairline aircraft.

You can readily see that general aviation aircraft outnumber those of the airlines nearly 50 to 1. There are those who say these figures are misleading because an airline airplane carries more people than a private airplane. Our problem here is much the same as that for the private automobile. We don't have complex statistical organizations constantly monitoring general aviation's activities, as do the airlines. But the fact that this same situation is true of the private automobile in no way detracts from the fact that the private automobile is one of the most important factors in the entire national economy.

But there are some allied figures concerning the private airplane that might be helpful. The airlines, for example, operate into 588 airports throughout the United States. However, there are some 7,028 civil airports. The major volume of airline traffic comes from those larger terminal airports at which the CAA can justify the installation of control towers on the basis of the volume of airplane traffic. These total 193 in the continental United States—less than 3 percent of the country's total airports. But at just those airports with towers, here are the official CAA statistics on aircraft movements for the calendar year 1957. I won't read that table either, but you can see that general aviation represents 50 percent of the total, including your airports at Wayne Major, Willow Run, Detroit City. As a matter of fact, Detroit City is almost 100 percent general aviation, as you know.

Note that general aviation already comprises 50 percent of the total traffic at those airports—more actual aircraft traffic than the airlines themselves. Obviously, there is one question that follows: What is the volume of traffic at the other 97 percent of the country's civil airports? We don't know, because no one, not even the CAA, is counting them. But we do know, for example, that general aviation flies several times more flying hours each year than all the airlines. And we did do a study not long ago which indicated that the average general aviation airplane carries an average of 2.9 persons on the typical flight. We applied the result of that sampling to the general aviation traffic at just those 3 percent of the country's airports and came up with more than 17 million persons carried. Once again, I wish we could even guess at what that figure would be for the other 97 percent of the country's airports.

What does this have to do with safety? It is important in several ways, as you will see. The most familiar safety problem at the moment is described by these much used, and abused, terms: "near miss," "midair collision," "congested airspace," "the jet age," and so on. Everyone has a solution for the problems, and the accidents that have highlighted them. The heavily favored solution is to enact drastic new, highly restrictive rules and regulations. Invariably the finger has been pointed at "private fliers," "Sunday pilots," and so on, with loud contentions that we should be barred entirely, or at least rigidly confined.

Mr. PLAPINGER. Who said this?

Mr. KARANT. Mostly, if you will pardon the expression, Members of Congress, airline people, and newspapers.

Mr. PLAPINGER. We have asked this question on a number of occasions and everybody who has asked the question answers that the needs of private flying must be recognized.

Mr. KARANT. Yes, this is a platitude that they throw in because we have been rather obnoxious about this subject. They don't really mean it. They say that you should be permitted to fly but ultimately you should never be able to go to New York City because everybody knows they get a lot of traffic. And I suspect when it comes time to go to Detroit, by this concept I might be permitted to fly my aircraft to Toledo and sneak up the highway on the bus and go into Detroit from there, but not fly directly into Detroit. Needless to say, we resist this——

Mr. PLAPINGER. Are you barred from any of the Federal airports?

Mr. KARANT. We can't be, under the present Federal law. But the Federal people are making noises like we might be barred. And this is a very serious problem to us, as you can imagine, with all this traffic.

Surely, no mere ordinary American citizen should be permitted to fly his own airplane to a place like New York or Chicago, they contend.

Surely this is familiar to you all, the facts notwithstanding. Therefore, I should like to discuss some of these facts with you, in the hope that you can help those of us in civil aviation to cope with the real problems, not the fancied Sunday-supplement problems. Inevitably we must deal with actual accidents, accidents which stirred up so much public indignation.

Now, let's take the Grand Canyon. The weather was excellent. The aircraft involved were both airliners. They were flying in uncontrolled airspace, in one of the remotest areas—surely the most uncongested—in the United States. And, incidentally, if you are interested in checking, you will find that the scheduled airlines are still operating through uncontrolled airspace through many parts of the country.

Mr. PLAPINGER. Why?

Mr. KARANT. Short cuts. It's the only reason. It is more economical.

Mr. PLAPINGER. Why isn't the airway across the short cut?

Mr. KARANT. Well, they can do this. They did with the Grand Canyon, of course, after the horse was out of the barn—but the reason you can't just plug in an airway anywhere is because an airway can only exist where you have minimum numbers of navigation aids along the airway so they can fly on instruments without seeing. But there are off-airways flights being conducted by the airlines. As a matter of fact, I think it would wreck them economically if they had to stick to the regular airways all the time. But now they represent this as a hazardous operation. They propose that all of the airspace where they fly should be controlled.

Mr. PLAPINGER. Do you fly in their airspace normally? Your people do not fly as high as a DC–6 or DC–7, do they?

Mr. KARANT. No. A DC–7 with a pressurized cabin cruises up around 22,000 or 24,000 feet. The jets would be higher. Our current types can operate as high as, oh, between 15,000, 18,000, and 20,000 feet would be tops with our types. We would have to carry oxygen to fly——

Mr. PLAPINGER. How many of your planes would be equipped to——

Mr. KARANT. All they need for equipment is oxygen.

Mr. PLAPINGER. How many of them do fly that high?

Mr. KARANT. There is a surprising amount of business being done in the sale of oxygen for private aircraft. This means they are flying

very substantial amounts of time above 10,000 feet. Ten thousand is where you normally should use oxygen, from there up. The performance characteristics of these current production aircraft we buy are such that we can fly them at 20,000 feet, if we want to go that high. This again projects us——

Mr. PLAPINGER. Who buys this type of aircraft?

Mr. KARANT. Businessmen.

Mr. PLAPINGER. This is the businessman? This isn't the so-called "flivver flying."

Mr. KARANT. This is not "flivver flying" any more, because even the cheapest current four-place plane—a Tri-Pacer is almost a $10,000 airplane. But private owners do buy these. The Tri-Pacer won't go to 20,000 feet, though.

I am going back now to the Grand Canyon. Both the pilots and their companies knew that airspace was uncontrolled, yet they had been operating through there constantly. The hazards that were present were better known to these people than to most others. They were both going in the same general direction and collided at a relative speed of about 33 miles per hour. General aviation wasn't even remotely involved, yet the uproar and rash of proposed new regulations might well have caused major damage to us if we hadn't fought openly against all the misinformation that was circulated about that accident.

Michigan City, Ind.: Again, excellent flying weather. These two airliners bumped against each other, damaged each other, but by the greatest stroke of luck, both landed safely. The public hearing revealed some frightening things. Several passengers in each airplane saw the other airplane in ample time to have avoided the collision—but the pilots all testified that they did not see the other airplane. This is not new; other passengers in other similar incidents have reported seeing the other airplane, though the pilots invariably have seen nothing prior to the collision.

Mr. PLAPINGER. Is this a question of the pilot failing to look out, or a question of cockpit visibility?

Mr. KARANT. Both. I'm going to get to that.

Brunswick, Md.: Again, excellent flying weather. Again, general aviation is not involved; this time it's an airliner and a military jet trainer. From the information we have at the moment, the military pilot simply was not looking where he was going.

Las Vegas, Nev.: Again, an airliner and a military jet. Again, perfect weather. This time a very high-speed jet fighter was being flown in a manner that is normal for it but which is extremely hazardous for any other aircraft in the vicinity. The hazards of this type of jet penetration have been well known to both responsible military, CAA, and CAB officials for years. They have always had the authority to restrict such operations, but they did not. Again, general aviation was in no way involved.

Just these few accidents in recent months have been responsible for so much hysteria that all civil aviation has been threatened with the most drastic new regulations. We have tried many times to point out that the causes of these accidents are well known, and that constructive action could have been taken long ago to prevent them. In other words, the present regulations are sufficient, if only someone would use them. Instead, sweeping, illogical, and hysterical proposals have

been made, all of which do not deal with the cause of the accidents themselves.

Mr. MEADER. You did not refer to any midair collisions in which privately owned aircraft were involved.

Mr. KARANT. I am about to.

Mr. MEADER. Oh, I see. I had glanced through here and I had not seen any of that.

Mr. KARANT. You will find it on—yes, here it is at the top of page 11.

Mr. MEADER. All right. I just thought this was an appropriate place to mention it.

Mr. KARANT. Yes, you are right. I decided to put it up there because it is an important point.

Now, I will give you a few examples of these causes:

Human frailties, I call it. Pilots are human beings like anyone else, and we all are careless at some time or other. We must work hard not to be, and a constant educational and enforcement program is needed. But few among the general public apparently can believe that a mere human trait of this kind can actually cause a horrendous accident like that at the Grand Canyon. Yet it can, just as it does every day on our highways, and just as it did when the *Stockholm* and *Andrea Doria* collided at sea.

Flying modern, complex, multiengined aircraft breeds inattention to looking where you are going, because it is actually easier to fly those airplanes on instruments than it is by looking out the windows. Some have contended that we believe all airline pilots are deliberately reckless. This is pure nonsense. They are the finest group of professional pilots on earth, bar none; and we in AOPA fly with them anywhere any time. But they are human; they make mistakes like the rest of us; they are not superhuman. And all the rest of civil aviation must not be threatened with drastic restrictions because no one wants to admit that airline pilots do occasionally make mistakes.

Now, cockpit visibility: The average transport airplane today has less cockpit visibility available to the pilot than does the average four-door automobile. A number of types of general aviation aircraft are also deficient this way. Most of the collision and near-miss problems with which we're concerned involve transport types, yet nothing whatever is done to correct that hazard. Back in 1952 a committee of aircraft manufacturers and professional pilots drew up minimum standards of cockpit visibility for transport aircraft. We approved of those standards so much—although AOPA had not participated in this committee—that we formally recommended to our Government that those standards be made part of our Civil Air Regulations—not only for airline aircraft, but for our own as well.

Mr. PLAPINGER. The SAE standards?

Mr. KARANT. Yes; the SAE, Committee No. 7, I believe.

That was 6 years ago. The standards have not been adopted in the regulations. Instead, we learn to our amazement that one of the latest jet transports now going into production does not meet all these minimum visibility standards. The Boeing 707, that is.

Mr. PLAPINGER. How about the DC–8?

Mr. KARANT. We didn't inquire about that. We made a quick check on the 707 because we have been following that for some time.

Speed limit: There are quite a few aircraft in the airspace today that can and do fly at speeds ranging from 500 to 1,500 miles per hour. Many years of experience with all sorts of vehicles on the ground and water tell us that speed absolutely must be controlled for the safety of all. But in the air we can't seem to get that point across. The closest we've ever gotten to it was the 180-miles-per-hour-speed limit in high-density zones—and the military even got themselves exempted from that. The safety of any aircraft anywhere in the general vicinity of an airplane traveling over, say, 500 miles per hour is in serious danger, because the pilot flying that airplane actually cannot see and react fast enough to avoid you—and you cannot see him in time to avoid him. Usually he is overtaking you from the rear. Now, I have had this one happen to me many times. It's a frightening experience and still I sit here and say that we are not congested, that these hazards can be coped with under the present rules. This happens around Washington frequently.

The airlines and military generally agree with this simple statement, but look what they propose as a cure. Pass new regulations that are designed to keep all the many thousands of other aircraft in the airspace away from in front of those speeding aircraft. In other words, drastically restrict the people endangered by such performance, but in no way restrict the performance. This philosophy has never worked on the ground or water, and it cannot work in the air. We must treat these extra-hazardous aircraft just as we treat extra-hazardous vehicles on the ground or water. They must conform to the rules laid down for the majority or be confined to special danger areas within which no one else can be endangered.

Now, on the subject of congestion, to say that our airspace is congested is to insult the intelligence of my 10-year-old daughter, who has had enough experience with cross-country flying, in one of the busiest sections of the United States, incidentally, to know that this contention is ridiculous. She expresses surprise whenever she sees another airplane anywhere along the way, much less come close to one. I have flown this country from one end to the other and from top to bottom, and I can tell you that I would never expect to be able to count more than a dozen airplanes in flight in my general area on a flight all the way from the Atlantic to the Pacific, or from Canada to Mexico.

As I have said, I keep my airplane here at Washington National Airport, and regularly fly to and from this airport, and to the airports at New York, Chicago—the world's busiest—Los Angeles, and almost anywhere else you would care to mention. I do this safely and with no difficulty, so long as everyone obeys the rules. Anyone who contends that our airspace is congested with too many airplanes for safety either doesn't know what he is talking about or is deliberately misleading you.

But when two airplanes do fly near each other and the pilot of each airplane doesn't look where he is going, then you have what is being loosely referred to as congestion. If those pilots keep going that way, you are sure to have the widely misued words, "a near miss." After that comes the word "collision." Now, this can happen with only two airplanes in thousands of cubic miles of airspace—as it did at the Grand Canyon.

In good flying weather we don't ever expect to live to see the day when we will see even 1,000 airplanes using the total Washington, D. C., airspace at the same time. Yet we have got well over 1,000 cars moving safely on the streets within sight of the building in which we are sitting.

There is congestion, under specific conditions; and those conditions have nothing whatever to do with the sort of allegations that are usually made about congestion. The true congestion today lies within the traffic-control system, which has rigid and very broad standards of safety and too many airplanes trying to squeeze into that system at the same time. The only reason the airplanes are "too many" is because the system itself is complex and, by its unusual nature, slow and cumbersome. If all automobiles on our streets had to stay 1 mile apart at all times, you'd have a comparable situation. There is also congestion within the operational techniques of the airlines. Their gates at airports get too many airplanes at them, and no more can get in. That is congestion. But general aviation is not affected by that, because it does not use those gates, nor does it schedule a dozen flights all at the same identical minute.

Now, let me say in passing here that this particular kind of congestion we are talking about applies to the instrument-flight system, IFR, Instrument Flight Rules. All of this preoccupation with the traffic-control system has to do primarily with the instrument-flight system. Factually, only 20 percent of the total traffic in the United States today flies on instruments. What we are concerned with is the other 80 percent, recognizing that we, too, participate in that 20 percent and that it is a problem and that we want these problems corrected. But we are trying to point out that the problem should be looked at objectively and on the basis of the facts and stop all this other stuff which sweeps in the other 80 percent of traffic which has no concern with this.

These are only some of the several points that could be dealt with profitably by safety personnel who were unrestricted in their efforts to find solutions to these hazards.

Now, there is a point about all this that we would like to make—and, now, I am going to get to your point, Mr. Meader. You will recall that I said general aviation aircraft outnumbered the airlines about 50 to 1. I am frankly puzzled, and very gratified, by the fact that virtually none of the terrible headline-making accidents that have stirred up so much fuss have involved us in any way.

In 1957, for example, general aviation—which flew some 10,500,000 hours during that year—had 13 midair collisions involving 12 fatalities. It would be most enlightening to see comparable statistics for 91,410 private automobiles driven that distance over a period of a year. After all, you would actually expect us to have more trouble, with such overwhelming numbers. Remember, too, that general aviation is, by and large, the common man, the nonprofessional—the motorist. He has few of the skills of the airline and military professional, his aeronautical knowledge is limited, and his aircraft is equipped only in a manner that his own private purse can dictate. And yet, general aviation has an admirable safety record, one that is regularly improving, and one we are all working hard to make a good deal better.

On the other hand, these accidents that are of such great concern to you are exclusively the doing of professionals—the most highly skilled professionals that money and training can produce. We must never lose sight of this fact in our planning of corrective action. And we cannot attempt to correct these deficiencies by trying to devise fabulously complex traffic-control systems and intricate new regulations to go with them. Whatever systems are devised must be designed to serve the user; you will never get very far trying to redesign the human being to serve some new system.

Mr. MEADER. Now, Mr. Karant, these five midair collisions in 1957 involved only so-called general aviation?

Mr. KARANT. Yes, sir.

Mr. MEADER. There was no case of a military plane and a general aviation plane in a midair collision, or a general aviation plane and an airliner?

Mr. KARANT. Not airliner. I can answer your question in connection with one accident I think of immediately, and that was where a jet trainer in Midland, Tex., was practicing instrument flying at a civil field on a clear, sunny day, and pulled up from the airport and overtook a Cessna 170 with a family of five in it. He ran it down from behind and scattered the family of five all through the residential area of Midland, Tex. I think that accident may have been included in this total, but I am not positive.

Mr. PLAPINGER. These collisions involved what, then, two general aviation planes?

Mr. KARANT. Yes. Usually it's around an airport which, for example, doesn't have a control tower and everybody flying around there has to look out for himself, and they can't see out too well. Or they get preoccupied because they are doing something else.

Mr. PLAPINGER. Do I understand there were possibly more accidents involving general aviation but these statistics are limited only to where there were two general aviation planes?

Mr. KARANT. That is the problem. I cannot answer that question, and I think it ought to be clarified. I can't answer that question.

Mr. PLAPINGER. Will you?

Mr. KARANT. I will.

Mr. MEADER. Have there been any midair collisions between general aviation planes and commercial airliners?

Mr. KARANT. Yes.

Mr. MEADER. None this year?

Mr. KARANT. I don't think so.

Mr. MEADER. None in 1957?

Mr. KARANT. No.

Mr. MEADER. Well, you mentioned here there were only——

Mr. KARANT. Well, yes, I'd say there were none in 1957 if they are not included in there. I am not positive but let me clear that up. [Later check reveals none.] In the past several years, there have been 12 accidents involving general aviation aircraft and airline aircraft. And the standard pattern of all of these, because of the nature of the airliner aircraft, is that they overtake and run down the unsuspecting private plane. If the pilot isn't looking where he is going, he can really catch up with you in a hurry. They sometimes travel at tremendous speed. This worries me about as much as any-

thing in connection with my flying in any part of the United States, around here especially.

Mr. MEADER. You are not worried about what is ahead of you; you are worried about what is coming up from behind.

Mr. KARANT. That is right. I have had them come so close to me that I could hear their engines over the sound of my engine.

Now, I should like to comment on the airport problem. As we have mentioned before, the airlines use about 8½ percent of the country's public and private civil airports. The remainder is used by general aviation exclusively. But at just those 588 airline-served airports, nearly 80 percent of the total persons flown into and out of those fields are carried by general aviation. Here are some typical comparisons:

At Lansing, Mich., with a population of some 92,000 people, airline aircraft carried 69,976 passengers in and out last year. But general aviation aircraft carried just over 142,000 persons.

Austin, Tex., with a population of 132,000, had 134,102 airline passengers last year, and 236,153 persons carried by general aviation.

Yet the problems general aviation is having with our airport system are much the same as the problems we have in other phases of aviation. Responsible Government officials almost automatically focus on the needs and desires of the commercial carriers, and pay little or no attention to the great majority of civil aviation. For example, the Civil Aeronautics Act of 1938 specifically empowers the Secretary of Commerce to plan for the orderly development of airports, airways, and other aids and facilities to serve all civil aviation. Instead, the Department of Commerce has repeatedly demonstrated the fact that it knows little or nothing about any civil aviation other than the commercial airlines, and cares considerably less. Most of the statistics quoted above, for example, are unknown to them. And yet, in order to plan for civil aviation, they should have been gathering such information themselves over the past several years. The result is that, even today, they are unable to plan an airport program for anyone but the airlines. There are some 17,000 communities in the United States that should have a landing area as part of the country's overall air transportation system, but our so-called Federal airport system planning has never even given this a cursory consideration. Why, for the cost of one runway like that at Chantilly, we could have a network of suitable landing strips across the State of Michigan.

AOPA looks upon the country's civil airport system as just as vital a part of our transportation system as are the highway or waterway systems. We feel the country should have an active and dynamic airport program, one that reflects the fact that airports are needed for all American citizens who fly, not just the commercial carriers.

We take the position that this airport system must reach as many United States communities as the public highway system reaches. We feel strongly that this public-use airport system must be as toll-free as the Federal highway system.

At this point, however, it would seem that the first thing the Department of Commerce should do to carry out its statutory responsibilities is to immediately set up a fact-gathering program, then predicate whatever actual airport program they lay out on the facts they have gathered.

Thank you again for giving AOPA the opportunity to appear before your committee.

I'd like to say one thing here, that Booz, Allen & Hamilton contract that you heard has been given to the Airways Modernization Board, is now going to do what I suggested the CAA or the Department of Commerce should have been doing.

Mr. PLAPINGER. Incidentally, in the national airport plan for 1958—I'm just looking at page 1—for Alabama, that general GS, I assume, is the designation for general aviation.

Mr. KARANT. GS—is this a State or Federal program?

Mr. PLAPINGER. This is the national airport plan issued by CAA. They seem to take cognizance of the fact that airports for general aviation are required in a number of places. And they have two categories, airports for air commerce and airports for general aviation.

Mr. KARANT. Yes, the——

Mr. PLAPINGER. Do they just ignore this?

Mr. KARANT. Well, by and large, we have trouble—there are a lot of technical troubles with that sort of a thing. We have advocated for a long time that a runway—it doesn't have to be paved—something that an airplane can get down on so that the people in the airplane and the people in the community that it adjoins can use air transportation.

Mr. PLAPINGER. Isn't the real problem the fact that communities themselves don't build airports for general aviation?

Mr. KARANT. The real problem is that the communities are air minded to the point where they'd take 50 percent of this Federal money if it were offered to them. But the opposite is also true. The CAA is reluctant to deal in the kind of a landing area I am talking about. I can only conclude because it is so inexpensive. I don't know what else to say about it. But if you just put in a single grass runway—or if there is a lot of traffic and it warrants it, put in a hard-surface runway. But the CAA normally does not do this thing that way. They always think in terms of Chantilly, and so forth.

Mr. PLAPINGER. But the local community has to come forward first, do they not?

Mr. KARANT. Yes. Well, the CAA——

Mr. PLAPINGER. Isn't this the root of the trouble rather than criticism directed to CAA?

Mr. KARANT. No, CAA has a responsibility also to encourage a community to do this. Most communities don't even know that this is possible, you know.

Mr. MEADER. I overlooked the intervention of a State agency, too. Some States require the approval of a request for Federal airport aid by the State aeronautical commission before it can be forwarded to Washington.

Mr. KARANT. Well, I know that I personally have had experiences with a number of communities around the country where I happened to be in the area. I would talk to someone, maybe a member of ours who was a member of the local city council. And I would point out to him, "Why don't you have an airport?"

"We can't afford it."

I said, "Well, do you know the Federal Government has a Federal airport program that will support 50 percent of this?"

"Well, no." They had never heard such a thing.

Mr. PLAPINGER. I am not so sure it is a deficiency of the CAA as it is of the local government. It seems unfair to criticize CAA when they get out an airport plan, when they say general aviation facilities are required in such and such a place, and they go down the line.

Mr. KARANT. Well, I don't know what that document means. Have they determined it is required and the community doesn't have an airport?

Mr. PLAPINGER. That is what I understand their plan——

Mr. KARANT. What I think this probably is, it is a record of the various communities in those States coming to the CAA.

Mr. PLAPINGER. Well, I questioned Mr. Borsari the other day. There are two headings—airports for commercial and general aviation. Under such heading there is a further subdivision, "Existing" and "Required"; and it indicates what there is and what is required. Now, sometimes the two coincide, but sometimes they do not.

Mr. KARANT. But I don't know who that——

Mr. PLAPINGER. The Department of Commerce is charged with formulating an airport plan under the act.

Mr. KARANT. Yes, but I am sure they don't initiate that. That must come from the communities. That is just my opinion. I don't know for sure.

Mr. PLAPINGER. May I ask one final question. We had some testimony—or at least I read some matter into the record—concerning articles in the National Business Aircraft Association magazine Skyways concerning the curtailment of weather facilities. What has been your experience as to the availability of weather information in recent years? The import of these articles was that there has been a serious curtailment of weather information.

Mr. KARANT. Yes. Well, weather information is probably as close to being one of our main arteries, let's say, in general aviation as anything I can think of. If the pilot who flies in general aviation—he lives by weather information. We have a number of problems. One of the problems is, of course, that weather facilities and information being made available to the average pilot has been becoming less and less available rather than more and more available. Now, there are programs designed to overcome some of this. One of them is operating experimentally here in Washington, and that is an automatic—it's fairly complicated—transcribed, tape-recorded broadcast of all aviation weather information brought up to date constantly by the Weather Bureau. And they just leave it running on a range station so that any pilot at home or in his aircraft can tune to this and get all the latest weather. This is a program scheduled for all other range stations around the United States, just a little over a hundred.

Mr. PLAPINGER. Will this blanket the country?

Mr. KARANT. Yes, it is supposed to. Now, this is one way of disseminating information at this time. But to the pilot in flight, well, the Weather Bureau has become so overloaded that it is extremely difficult to get even the original services that we used to get out of it. You try to call them on the telephone, for example, and you can't get them. It's impossible. So the pilot has to take time out and either fly over to the airport where the information exists and go up to the—although he is not a trained meteorologist, but the law of

self-preservation quickly makes you one. Or he just takes off and flies without the information.

These programs I mentioned to you are designed to overcome some of them. I don't know specifically what NBAA described as a deficiency in the weather service.

Mr. PLAPINGER. I am reading from the May issue of Skyways, May 1958:

> The Weather Bureau offers less aviation service today than it did 10 years ago; and during this period there has been a loss of 85 weather stations and 279 weather service employees. During the same 10-year period, the aircraft operations have more than doubled and CAA fixed postings have quadrupled. New approaches have increased sixfold.

Mr. KARANT. I agree. That's right. They do, in the interest of economy, cut down observation stations; and this is a very serious thing.

Mr. PLAPINGER. Of course, Milton Arnold told us yesterday that the CAA and the airlines themselves fill in when this is done, and provide their own observation service which is made available to everybody.

Mr. KARANT. That is correct. But when you are making total counts, if the Weather Bureau tells you they are taking weather observations or have observations at X number of stations around the country, they include those. They call them supplementary observation stations, and those are those airline people.

Mr. PLAPINGER. I see. Your reference to Decca here seems to indicate that you think that maybe we ought to go to Decca now rather than VORTAC.

Mr. KARANT. No, I am afraid not. I said what I did about Decca only to show that it is a very real threat, because it exists. It can be used——

Mr. PLAPINGER. Why is it a threat?

Mr. KARANT. Because we are now in another one of these states of flux, as they call them, in which we are trying to get VORTAC, or just VOR, preserved——

Mr. PLAPINGER. You mean it's a threat to adoption of VORTAC internationally?

Mr. KARANT. That's right; internationally.

Mr. PLAPINGER. Were there any threats at the time VOR——

Mr. KARANT. Oh, yes; and Decca was one of them. But, see, once the international agreement was made—and it was made under the greatest strain in Montreal years ago—it took quite a bit of doing on our part when they finally prevailed and the United States position was adopted and this became the standard—all these other systems, and Decca was just one, were officially and presumably put aside and they said, "Boys, we have picked it. For better or for worse, there it is." But the moment we opened up that basket of snakes with VORTAC, back they all came, in a much better state of development than they were back then. And if you think we havent' got a basket of snakes now—the French have got a system now—they have invented another one—they call it Radio Web. They are pushing like the devil for it. Much like Decca.

Mr. PLAPINGER. The CAA has told us they concede there are deficiencies in the system but they do not think it is anything that cannot be overcome.

Mr. KARANT. I hope this is correct. What this is going to cost before they overcome it, I don't know.

Mr. PLAPINGER. Your main bone of contention really is that we have accepted a system really on the basis of the miliary need which has been unchallenged?

Mr. KARANT. Only. And it has given nothing to civil aviation. It is a system which exactly and not very accurately has duplicated the original VOR/DME system which we had bought and paid for.

Mr. PLAPINGER. Do you believe we need a common system?

Mr. KARANT. Absolutely. Well, what do you mean by "common system"? You see, we need a common system all right, but it's the ability to fly from one point to the other. Now, the term "common system" must not say, and probably will never be able to say, that in order to fly from this point to this point every airplane in the area has to carry exactly the same piece of equipment.

Mr. PLAPINGER. But you agree that, if the equipment that is being used by the civil aviation is incompatible with the equipment used by the military, that that situation can't exist?

Mr. KARANT. Yes, you are right, it can't exist.

Mr. MEADER. Mr. Karant, we appreciate the statement you have made contributing to our record on the Federal role in aviation. And it is always interesting to listen to your frank and colorful expression.

Mr. KARANT. Thank you, sir.

Mr. MEADER. The committee will adjourn until tomorrow morning at 10 in this room, and we will hear Mr. Clarence N. Sayen, president of the——

Mr. PLAPINGER. Mr. Sayen will be unable to appear, we understand. There will be a representative from the Air Line Pilots Association.

Mr. MEADER. And Mr. William Lawton will be with us.

Mr. PLAPINGER. Mr. Lawton will follow the Air Line Pilots Association.

(Whereupon, at 1 p. m., the subcommittee recessed, to reconvene at 10 a. m., Thursday, July 31, 1958.)

FEDERAL ROLE IN AVIATION

(1958)

THURSDAY, JULY 31, 1958

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON LEGAL AND MONETARY AFFAIRS
OF THE COMMITTEE ON GOVERNMENT OPERATIONS,
Washington, D. C.

The subcommittee met, pursuant to recess, at 10:15 a. m., in room 1501, New House Office Building, Representative John A. Blatnik, chairman of the subcommittee, presiding.

Present: Representatives John A. Blatnik and George Meader.

Also present: Jerome S. Plapinger, counsel; and Elizabeth D. Heater, clerk.

Mr. BLATNIK. The Legal and Monetary Affairs Subcommittee of the House Committee on Government Operations will please come to order in further hearing on the Federal role in aviation.

This morning our first witness is Capt. J. D. Smith of the Air Line Pilots Association.

Mr. Smith, would you please take a chair up close to the committee?

Good morning, Captain. We appreciate your assistance in coming to appear before the committee this morning.

Captain, do you have a prepared statement?

STATEMENT OF CAPT. J. D. SMITH, CHAIRMAN, AIR TRAFFIC CONTROL COMMITTEE, AIR LINE PILOTS ASSOCIATION; ACCOMPANIED BY THOMAS BASNIGHT, AIR SAFETY REPRESENTATIVE, AIR LINE PILOTS ASSOCIATION

Captain SMITH. Yes, I do.

Mr. BLATNIK. As you open your statement, would you give a brief biographical summary sketch of your background and experience and position in the association?

Captain SMITH. Well, sir, I am employed by Capital Airlines. I am a line pilot. All of this work I do is in my spare time. Presently I am the chairman of the Air Line Pilots Association, air traffic control committee. I am regional safety chairman in the first region, which comprises the 15 Northeastern States. I am a member of the New York air space subcommittee and New York air traffic control committee. I have been a State Department adviser to the United States Jet Planning Committee.

Mr. PLAPINGER. These New York positions you refer to, are they part of the Air Coordinating Committee?

Captain SMITH. Yes, sir.

I am also the association member to the main Air Coordinating Committee in Washington. I have been chairman of the RTCA SC–76 Committee, which is the group working on establishing jet operational procedures for domestic United States operations.

I have some others that do not come readily to mind offhand, but I do spend some time in traffic control work and in dealing with various Government agencies as far as other industry organizations are concerned also.

Mr. PLAPINGER. How long have you been a commercial pilot, Captain Smith?

Captain SMITH. I have been with Capital since early 1945.

Mr. PLAPINGER. And that constitutes your commercial pilot experience?

Captain SMITH. Prior to that, I instructed in the old Army Air Corps.

Mr. BLATNIK. Captain Smith, would you proceed with your statement?

Captain SMITH. Thank you, sir.

I would like to say at the outset that Mr. Sayen had intended to be here. However, his schedule would just not permit it, and he asked me to express his regrets, particularly in view of the fact that this is a subject with which we are vitally concerned, namely, the overall safety of aviation.

I have also brought with me a film that will run about 18 minutes which covers the latest evaluation of runway lighting, which is quite an important part of our phase of the operation in connection with improving our all-weather reliability. I think we can either show it later, if you care to, or at any time that you so desire, or, if you would rather, I could start out with this.

Mr. BLATNIK. You guide us, Captain Smith. At the appropriate place we would be glad to see the film. Perhaps you had better start off with the written statement.

Captain SMITH. All right. Yes, sir.

This paper contains viewpoints of the Air Line Pilots' Association concerning the need for improvement of air navigation facilities and other aspects of the United States airways modernization plan. This includes problems of improvement for our Nation's airline airports and points out how we believe the Federal Government can be of assistance in improving our airway system.

IMPLEMENTATION OF THE 1956 VORTAC DECISION

The Air Line Pilots' Association is not interested in VOR, TACAN, VORTAC, or any other of the particular types of navigational equipment as such. We are interested, however, in getting sufficient precision and reliability to properly carry out our responsibilities to the traveling public. We have little firsthand knowledge of the capabilities of the VORTAC system. It appears to us from an interested party viewpoint that the implementation of the VORTAC system has been very slow. As a matter of fact, we know of only one operating facility in the United States.

I might clarify that statement. It is in connection with a CAA-operated VORTAC which traffic control might be predicated on.

Obviously, the members of our association have not had an opportunity to utilize this equipment in the day-to-day airline operation. We believe that a thorough analysis of the VORTAC capability versus the VOR, DME, and other navigational aid capabilities should be conducted immediately—as a matter of fact, should have been conducted long hence. We understand that the CAA has airborne equipment and is now capable of making an objective and complete comparison of the system's capabilities.

Our association would be glad for the opportunity to participate as either crew members or observers in the aircraft which conducts such an analysis. If this could be arranged, we would be very glad to offer a complete report on our findings. We are interested as taxpayers in the cost of a dual development such as VOR–DME—VORTAC.

Mr. MEADER. May I interrupt there?

Mr. BLATNIK. Mr. Meader.

Mr. MEADER. Do I gather you have made a request to CAA to participate in the study of this airport equipment and have been refused, or have you not made such a request?

Captain SMITH. We have attempted, sir, to maintain a close liaison with CAA in connection with determining the reliability and accuracy of this equipment. One of the coordinating procedures that is undertaken by CAA is to forward us their long-range planning, for example, on airways. Then they, as a user, will request us to forward our comments. It is kind of difficult to forward back an acceptance of their proposal when we are not sure that the VORTAC, for example, will provide the same accuracy as the VOR's. The airways are becoming closer and closer spaced.

Mr. PLAPINGER. Excuse me. You say you are not sure whether VORTAC will be able to offer as complete accuracy as VOR. VOR is part of VORTAC. You are talking about distance measuring, are you not?

Captain SMITH. Well, VOR is part of VORTAC to this extent: The VOR operates on a certain frequency band and there is a separate transmitter. The TACAN band is a separate transmitter. These 2 transmitters are cosighted, so for all intents and purposes you have 2 systems down there at this 1 site on the ground. The DME, which is distance measuring equipment, is paired with the TACAN system, so that the VOR and the TACAN are actually not the same thing. They are two separate transmitting systems that are cosighted at one location.

Mr. PLAPINGER. You are talking about the accuracy of VOR as against the azimuth portion of TACAN. Is that right?

Captain SMITH. That is correct.

Mr. PLAPINGER. But you are not going to be using the azimuth portion of TACAN.

Captain SMITH. We are not at present. However, as soon as someone can find out which equipment should be put in the aircraft, it is a certain possibility that TACAN–DME will go into airline traffic.

Mr. PLAPINGER. TACAN–DME, but not TACAN azimuth?

Captain SMITH. If the airlines put the DME equipment in the aircraft they will have to buy all new receivers, because it will automatically require them to use TACAN.

Mr. PLAPINGER. You mean the airlines will not be able to use VOR as you use the DME portion of TACAN?

Captain SMITH. Not the way the system is set up today. This requires completely new equipment. In other words, the DME as it will be paired in the VORTAC system is not compatible with the VOR receiver in our present aircraft.

Mr. MEADER. To get back to my question, Mr. Smith, I am not quite clear whether there have been flights with this airborne equipment conducted by the CAA up to the present time. Do you know whether they have?

Captain SMITH. Yes, they have. It has been under constant evaluation at Phillipsburg for pretty close to a year now.

Mr. MEADER. I gather the Air Line Pilots Association has not participated in any of those flights?

Captain SMITH. No, sir.

Mr. MEADER. My question was, "Have you asked the CAA to participate in them?"

Captain SMITH. Yes, sir.

Mr. MEADER. And they have refused to let you do it?

Captain SMITH. I do not know whether you can call it an out-and-out refusal. I think the fair way of saying it is we never received an invitation to be aboard the aircraft when they were testing the system.

Mr. MEADER. But you have asked for permission to be aboard?

Captain SMITH. Oh, yes, sir.

Mr. MEADER. And they have not turned you down, but they have not invited you either. They have just been silent when you made your request. Is that it?

Captain SMITH. Yes, sir. Up to this time we have received no official information from CAA concerning the accuracy and reliability or the operational workings of the TACAN–DME system at Phillipsburg.

Mr. PLAPINGER. Have you ever been on any flight with CAA while they have been testing the equipment?

Captain SMITH. No, sir.

Mr. PLAPINGER. Have you ever visited the Phillipsburg site at the invitation of the CAA?

Captain SMITH. Not on the ground. I fly over it all the time.

Mr. PLAPINGER. Can we get back to VORTAC? You say the DME portion of TACAN is incompatible with VOR.

Captain SMITH. This is as far as the airborne equipment is concerned. For example, there are many DME sets in executive type aircraft today. If these people are to continue using DME they will have to go out and buy an entirely new receiver.

Mr. PLAPINGER. That is right, but suppose they have VOR–DME. Will they have to go out and buy an entirely new receiver, or only a distance-measuring receiver?

Captain SMITH. This is a point which I think will be primarily set up by the manufacturer. It is quite difficult to have one receiver work off VOR azimuth and then use the TACAN phase of the DME in the other set. It is my understanding this will not be the way it will work. Should the manufacturers change their philosophy, it may well be.

Mr. PLAPINGER. But there is no incompatability between VOR and DME. This is why I am questioning you. You mentioned that the

DME portion of TACAN is incompatible with VOR, or did I misunderstand you?

Captain SMITH. From an airline standpoint. Evidently I did not make myself clear on it. As far as we are concerned, if we will go to DME it will require all new equipment in our airplane.

Mr. PLAPINGER. Is it because the VOR is incompatible with DME or is it a matter of space in the airplane?

Captain SMITH. A matter of space, weight, and cost.

Mr. PLAPINGER. But not incompatibility as such.

Captain SMITH. Not from a true technical sense of the word. No. But from an operating standpoint we would consider it to be incompatible.

Mr. PLAPINGER. I see.

STATUS OF THE AIRWAYS MODERNIZATION PLAN SINCE 1956 HEARINGS

Captain SMITH. The CAA program for implementation of modern aviation aids in the last year has been gaining momentum. However, we do not believe improvement at the present rate is adequate. Among the items which we believe are needed now to improve air-traffic control for positive traffic separation are the following. This is broken down into various sections. The first one would be surveillance radar.

1. RADAR

(*a*) Surveillance radar: In the vicinity of airports surveillance radar is needed in all high-density areas to assist the safe flow of traffic into and out of the terminal areas to increase traffic capacity. Not enough of this equipment is programed for installation.

I might point out in this particular item that a very serious deficiency on the terminal radar that is in effect today or that is being implemented right now concerns the lack of altitude information in connection with jet operations. In the New York area, for example, the terminal radar which is used to process the aircraft in and out of the airport for all intents and purposes has a ceiling of 14,000 feet. Our jet operations therefore will have to be penalized through the process of holding them 50 to 75 miles out so that they can be dropped down to a lower altitude and brought in at the lower altitudes, which is a rather serious economic penalty and will also adversely affect their traffic flow capacity when more aircraft come into operation.

So it is vitally important that the radar equipment used in the terminal area have sufficient altitude information where the aircraft can be operated the way it is supposed to be.

Mr. PLAPINGER. The Federal airway plan for the fiscal years 1959 to 1963 programs 138 units. You say not enough of this equipment is programed for installation. Does that mean you need more than 138 units?

Captain SMITH. I think probably the best way to answer that, Mr. Plapinger, is to point out that we operate in over 550 airports in the United States in scheduled service, and certainly there are many more. One advantage of this type of equipment is, in some areas it can be used to serve more than one airport. At Idlewild, for example, that

terminal radar serves Floyd Bennett and Mitchell Field, and a couple of others out on the island—MacArthur—and it does have some good capacity.

In some other areas it cannot be used for more than one airport because of some of the coordinating problems within the controlling agency.

Mr. PLAPINGER. Do you know where these surveillance radars are to be installed—the 138?

Captain SMITH. The exact location? No; I do not.

Mr. PLAPINGER. Do you have any idea of how many more would be required? How would you know that without knowing where they are to be installed?

Captain SMITH. I think the point we are getting at here is to answer that question, that for the next few years anyway the maximum advantage gained around the airport will be from radar procedures. Presently we are experiencing numerous delays and oftentimes cancellations because of our inability in the traffic-control system to handle us at other than a high-density airport. In order to maintain the system reliability and a sensible on-time operation, this is a very important piece of equipment.

Mr. PLAPINGER. Is this program off by 50 percent, 100 percent, or 200 percent?

Captain SMITH. I cannot answer it in quite that way because, as I point out, it is possible to have one serve more than one airport. If someone were to take the position 138 additional surveillance radars will handle all of the airports we operate into and they have a program on this thing that we could evaluate and that we agreed with, then I would say this statement we made here is not correct. At the present time we do not believe 138 is enough.

Mr. PLAPINGER. Have you made overtures to CAA requesting information as to where these 138 will be installed?

Captain SMITH. Well, this comes out in the form of quarterly or semiannual reports made by ACC to its membership, and it is continually updated.

Mr. PLAPINGER. You are a member of ALPA, which is a participating member in the ACC.

Captain SMITH. That is right, but we have found out when this report comes out the pressure of current activities will oftentimes by itself change it. For example, there was a terminal radar schedule for Willow Run Airport about 2 years ago, and this came from Miami, where the radar was supposed to go in. This had the top priority, and because of the pressure in the Golden Triangle, for example, it was decided to pull it out of Miami and reschedule it there. This goes on all the time where you have to move it someplace when you want to put the fire out. This throws off the long-range planning.

I think the main point here is when we get into stating not enough of the equipment is programed for installation, we are referring to the actual commissioning of the equipment at the earliest possible date.

Mr. PLAPINGER. The program should be accelerated. Is that what you are saying?

Captain SMITH. That is correct. That is the basic problem.

(b) Long-range surveillance radar: This is urgently needed within the normal climb and descent areas of air-traffic control to facilitate

the safe interflow of traffic between flight levels to make efficient use of our airways. Presently, without radar, 10- to 15-minute separation between aircraft is needed in order to assure separation of traffic climbing through traffic altitudes. Radar control would reduce the separation required to less than 2 minutes.

I think a very simple example of the advantage of radar in this case is if I am flying a Viscount I will have a 40-mile chunk of airspace around my aircraft that theoretically no other aircraft will be permitted to enter. I take the same 40-mile piece of airspace and with the same radar equipment I will be able to put in 8 airplanes, if not more; but 8 will fit in very conveniently. The radar equipment at New York was shut down for the past some twenty-odd days and was recommissioned yesterday, and I am sure anybody connected with the operation out of New York for the previous 3 weeks can fully indicate the importance of this equipment.

Mr. PLAPINGER. Why the shutdown?

Captain SMITH. It was for modernization.

Mr. BLATNIK. What is the range of long-range surveillance radar?

Captain SMITH. It is a functon of altitude. Presently they are using it about 85 to 90 miles outside the New York area today, with the equipment that is going in.

Mr. PLAPINGER. Is there not some way they can step up the signal?

Captain SMITH. This is a function of the antenna. This is one of the modernization plans that went on up in New York. It is hoped this will eventually stretch out to about 150 miles. But this has to be determined with experience. I believe that present thinking is it will work out that far. In connection with long-range surveillance radar, we were advised approximately 5 years ago by CAA that a radar airway would go in between Boston and Norfolk for the purpose of properly evaluating this equipment. It is still not in, and we think if this could be brought into focus and used in order to evaluate the capability of the equipment on an everyday basis, then we can have a pretty clear picture of just how much relief the further expansion of this type of equipment will give us.

It is quite simple, as I pointed out, when you can use 3- and 5-mile separations instead of 40- or 50-mile separations. Your capacity greatly increases.

Mr. BLATNIK. The question is, would a 3- to 5-mile separation be adequate with the new jets?

Captain SMITH. Yes, sir. The 3-mile separation, for example, concerns the area within, oh, 25 to 30 miles of the airport. The specific criterion in the book is within 40 miles, you maintain a minimum of 3 miles separation. The 3-mile separation is the minimum that can be permitted. Outside of that, the minimum permitted is 5 miles. In other words, the controller has to regulate his traffic so that the airplanes never get closer than 3 miles within 40 miles of the airport, or never closer than 5 miles outside of the 40-mile area.

What they do, being human, is they put in their own buffer, so they may have an additional 2 miles to put on there to guarantee the 3.

We have found out that for the most part this has been quite satisfactory. Where they have the breakdowns it is due to the human element and the fact that the person is overworked, and maybe has too much traffic to handle, or there are conditions outside of the criterion that are causing the problem.

So, in answer to your question, I would say from our experience, yes. We do have considerable experience with jet aircraft and in the handling of military flights. Up in New York, for example, there are many jet operations handled at Mitchel and the same way down here.

(*c*) Airport surface surveillance radar: The control towers at some airports are so located that they are unable to see all of the ground traffic from the tower location under some weather conditions, partially because of the distance from the control tower and partially because of the altitude of the control tower position above the airport surface. This equipment is a vital necessity for full airport utilization at high density locations.

There is one of these pieces of equipment at Idlewild, and it is an extremely accurate working system. I checked with some of the controllers yesterday, and it is possible for a controller sitting 200 feet up above the ground at Idlewild to tell when a person gets out of an automobile at the airport. It will distinguish the number of tails on an airplane. For example, on a Constellation it will pinpoint the three tails. This is far beyond the expectations we had hoped for on this equipment, and certainly now that it is available and the airports are getting bigger, the controllers are having a difficult time in being able to maintain a good movement of traffic within the airport itself.

So the implementation of this equipment would be very helpful both from a traffic flow standpoint and from a safety standpoint.

We are getting into an area now where our operation is being safely conducted in low weather conditions, and many times we are having to feel our way around an airport trying to find out where we are going when there is no way of knowing who else is around. Certainly some form of regimentation has to be practiced to take care of that problem.

Mr. MEADER. Are any of these surface surveillance radars in operation now?

Captain SMITH. Yes, sir. At New York International Airport there is one. This is the one I referred to just previously.

(*d*) Radar transponders: The radar beacon system identifies aircraft by having ground units intetrrogate airborne transponder systems. This procedure positively identifies the aircraft which is being seeen on the radarscope. This is a development of vital importance to the air traffic control system. Positive and prompt identification of traffic is vital to the efficient usage of airspace. The earliest implementation of ground transponder beacon system and the airborne counterparts is a vital part of the overall traffic control system. Installation progress on this item is far behind schedule.

In passing I might point out that the radar transponder going into our airplanes was perfected over 20 years ago, and we still do not have it on board our equipment. One airline has 80 of these in their aircraft today, trying to get some relief with a better traffic flow. So far the ground phase of it has been rather slow to be installed.

Mr. PLAPINGER. What airline is that, Captain Smith?

Captain SMITH. That is Eastern. This has also been evaluated before with Mohawk and Lake Central. They have conducted a very extensive program with CAA on this. We believe this is a vital piece of equipment mainly because it permits the controller to maintain a positive identification of your flight and goes a long way toward

eliminating any of the human element in connection with controlling traffic flow.

(*e*) Proximity warning device: An electronic proximity warning device which is now in the process of development is vitally needed and should be encouraged by the Federal Government by all means at its disposal.

We feel that the proximity warning device, or whatever name is attached to it, is one of the most important things we can get into aviation. For example, we feel that one of the greatest ways of maintaining the traffic flow is to have some equipment in the airplane which will permit crews to be able to determine where the traffic is around airports, or enroute, and thereby return the see-and-be-seen concept to the cockpit.

Of necessity, we have had to direct a lot of our efforts toward utilizing the existing services because that is all that is available. We believe a combination of proper equipment in the aircraft along with monitoring equipment on the ground will be proving to be the safest feature we can get into aviation.

One of the primary reasons why this particular piece of equipment is not available today, or is not produced, is due to the fact that there has been very little guidance of specifically outlining the requirements for this equipment. In this case I believe some procedure could be established to pinpoint and establish a specific set of requirements which would reflect the needs of the users. The electronic people could then come to grips with the thing, and in all probability at an early date have some answers.

Mr. PLAPINGER. Who is developing this now?

Captain SMITH. Everybody is working on various programs. I have had 8 or 10 manufacturers contact me in the last year or year and a half with philosophies and ideas and breadboard projects. But the problem is that they very seldom understand the problem they are trying to solve, because nobody set up the requirements for the equipment.

Mr. PLAPINGER. Is the Airways Modernization Board working on this?

Captain SMITH. They are. They are pursuing this thing with considerable vigor, as they indicated to us. However, we still do not believe that the proper set of requirements have been established.

Mr. PLAPINGER. Have there been any requirements established?

Captain SMITH. There have been. The Air Transport Association, for example, established requirements.

Mr. PLAPINGER. Are they deficient?

Captain SMITH. They were deficient to the extent that they closed the philosophies that could be used as a means of coming up with an answer. The Air Transport Association requirements specifically and initially called for a self-contained system. This in itself immediately gets the equipment above the level of the private pilot or many executive pilots, because of the tremendous cost involved.

Mr. PLAPINGER. What other requirements have been set down by the Airways Modernization Board?

Captain SMITH. This I do not know. They have let out contracts. On the work specifically we do not have the information.

Mr. PLAPINGER. Does ALPA have any contact with the Airways Modernization Board? Do they have any continuing liaison?

Captain SMITH. We attempt to maintain one. We have had a briefing with it in the last 90 days.

Mr. PLAPINGER. Was this matter discussed?

Captain SMITH. Oh, yes. We reaffirmed our interest in this project and they indicated to us that they have farmed out some contracts on the subject and they are waiting to see what comes back to them. This is their own philosophy. You know what the problem is and then you set up some requirements, and if the equipment will handle the requirements then you know your philosophy phase of the thing is over.

The way it will work now is that the proposals will come back and they will be evaluated, and where there are deficiencies maybe we enter into compromises in order to get the equipment working, or at least start out with something better than nothing.

We have been experienced in this type of thinking for a long time, and this is just not an expeditious way to handle the problem.

Mr. PLAPINGER. Have you made your thoughts known to the Airways Modernization Board?

Captain SMITH. I think on this point we have made our thoughts known to everybody, pointing out the importance as far as getting on the airplane is concerned.

All of the above radar facilities can be aided in their development by congressional assistance through adequate appropriations to the air traffic control program and through the insistence that military radar now available be expeditiously incorporated into the system.

I would like to point out in passing on this point that we have been advised by the military that their ADC, Air Defense Command, radar, is compatible with CAA's requirements to effect traffic control. We have been advised by CAA that the Air Defense Command radar is not of sufficient quality to do the job. The result is, consequently, we are caught in the middle. Where this radar equipment can be utilized advantageously we believe that the procedure should be established at the earliest possible date. We have gained a tremendous amount of relief and considerable assistance from the military radar installations in advising us of thunderstorm activity, or other adverse weather conditions.

Mr. PLAPINGER. Is not the CAA using some of that military equipment now?

Captain SMITH. CAA is using some military equipment. For example, radar here in Washington——

Mr. PLAPINGER. That is what I was thinking of.

Captain SMITH. Is an old piece of antiquated military radar. This was one of the first sets they started to use. However, since this time there is radar spread throughout the country that has much better accuracy and capability than what is here in Washington. Also bearing in mind that a major part of the defense of this country is predicated on Air Defense Command radar, it seems kind of unusual that it will not do a job to identify aircraft, which is the purpose it is there for in the first place.

Mr. PLAPINGER. You are saying now that CAA does not utilize the military radar, or are you saying it does not utilize it sufficiently?

Captain SMITH. They are not using the Air Defense Command radar. We have been told by CAA it will not meet their requirements. On the other hand, we have been told by the military that it will.

If somebody could just find one way or the other for sure, so that we can either use it or not use it, and then know what kind of additional radar we need, I think we would be on the way to some improvement. I can only point out once again that we have received a tremendous amount of assistance from the military in connection with their Air Defense Command radar.

Mr. PLAPINGER. What form does that assistance take?

Captain SMITH. There is a procedure in effect now that has been used for approximately 3 to 5 years. I am not sure of the exact length of time. When we are experiencing adverse weather conditions, such as thunderstorm activity or tornadoes or hail or maybe icing conditions or things of this nature, we have a procedure whereby we contact one of these Air Defense Command radar sites and they provide us with information concerning the areas of turbulence or hail and assist us in flying around them. Thereby we can provide a smoother flight to the passenger and stay out of the turbulent areas, which put a rather unusual stress and strain on the aircraft structure itself.

This has been a very valuable assistance. This would lead us into communications.

2. COMMUNICATIONS

One of the bottlenecks in our air-traffic-control system is the lack of sufficient communication to process air-traffic-control messages in a desired minimum time for efficient transfer of information from one controller to another and to pilots. We believe that sufficient technical knowledge is now available to eliminate pressing problems in communications providing sufficient funds are made available to establish lines of communication required to adequately do the job.

Automatic air-to-ground-communication systems are in the process of being developed and it is believed that much communication equipment that would be provided now under present needs could be converted to be used with an automatic communication system. The safety advantage now and in the converted usage of the new equipment later should provide adequate reason for not delaying further.

The Airways Modernization Board's first contract that they let out concerned improved data-processing techniques for controllers, which I personally believe was the No. 1 item on the hit parade in need of relief. We have put in a little form of automation up in the New York area in connection with accepting flight plans which completely eliminated this point as a cause of delays. It was a very simple process and a very inexpensive piece of equipment, and certainly pointed out with a little better communications and a little better means for coordination that a lot of relief will be gained.

The primary reasons for our deficiency in today's traffic-control system concern communications. Our two recent midair collisions were the result primarily of no one knowing where the other one was. There were no procedures established to point this out or make this information available.

Mr. PLAPINGER. Would DME have helped this situation?

Captain SMITH. Not on the last two. Ours, for example, here at Brunswick, and the one out at Las Vegas. Because all that DME would have done would have been to tell one of the pilots how far he was from the station.

Mr. PLAPINGER. Would it not also inform the controller how far each was from the station, and could not the controller then have notified each of the pilots?

Captain SMITH. This would have been true if the controller could have identified the aircraft. The only way that the controller can be aware of a problem out there, and to the extent that he can provide some assistance, is to be able to know the two aircraft are out there, and who they are, and what altitude they are at.

Mr. PLAPINGER. If the pilots are required to report from time to time, would not the controller have some of this information at his disposal?

Captain SMITH. This is correct, but this is how simply these two accidents could have been avoided if this would have been done.

Mr. PLAPINGER. Then would this not have been possible with DME equipment?

Captain SMITH. All this would have done would have been to indicate to the controller who in turn would have had to relay the information back to the two pilots.

Mr. PLAPINGER. That is right.

Captain SMITH. But the primary premise would have to be the fact that the two——

Mr. PLAPINGER. Would have to communicate with the controller in the first instance.

Captain SMITH. That is right. Actually, the communication system is antagonized by the fact that separate procedures have been in effect for a long time. The frequencies we use are totally removed from the military frequencies, and this has been perpetuated by the Air Coordinating Committee. This was their attempt to solve the communications problem. Unfortunately, however, it worked backwards, because one side does not know where the other side is.

In our reviewing of local procedures with various military people around the country we keep coming up to this one point of how simple it is, and how much better safety can be gained merely by letting someone know where you are.

Mr. PLAPINGER. What happens at a terminal area, or is there no problem in the terminal area because everybody is under tower control?

Captain SMITH. The terminal area is considerably better, because you have the coverage. You have the radarman there and people are contacting him. He is able to provide you with some assistance and pinpoints traffic for you. Our high density areas have very good service because they have the equipment to do the job. But one deficiency with radar, which I am sure has been pointed out, is that there is no altitude information on the radarscope. This is the reason why it is so important for the pilot to orally advise the controller where he is, so that he can pinpoint him, and then advise the altitude.

Mr. MEADER. May I ask you a question? Maybe it is not a very sophisticated question.

Let us take the Brunswick, Md., situation. I understand that the military plane would not be on the same frequency as the Capital plane.

Captain SMITH. That is correct.

Mr. MEADER. Would they both communicate with the same point on the ground if they were reporting their location?

Captain SMITH. Yes, sir.

Mr. MEADER. But one would report on one frequency and one on another?

Captain SMITH. That is correct.

Mr. MEADER. But if you had two commercial planes, they would have been on the same frequency when they reported?

Captain SMITH. Yes, sir.

Mr. MEADER. So suppose it was an Eastern plane that had been there instead of a military plane and your Capital *Viscount*. Would the pilot of the *Viscount* have heard the Eastern pilot reporting to the ground?

Captain SMITH. Yes, sir. We consider this to be one of the most effective monitoring processes we have.

Mr. MEADER. Would you have your set tuned at all times so that you would automatically hear it the minute that Eastern pilot reported his position?

Captain SMITH. We have our radios tuned in from the time we start the engines until we shut them off. We are required to be guarding the frequency every minute we are running that airplane.

Mr. MEADER. Both are required to report in as to their positions from time to time; are they not?

Captain SMITH. Military and civil?

Mr. MEADER. Any two commercial planes, I mean, would be required to report in?

Captain SMITH. Yes, sir.

Mr. MEADER. How about the military? Is it required to report in, too?

Captain SMITH. No, sir. I had better clarify that a little bit further, so I do not mislead you. If the military were operating IFR he would be required to make the same reporting we do. If he is operating VFR, and the same case with us, there is no procedure to require us to pass this information on to the controllers. We have automatically eliminated a great majority of this type of operation because we utilize IFR procedures all over the country.

But for the most part I could say it this way: At altitudes of 10,000 feet and above we are in direct contact with the controllers where the direct frequencies are available or we are guarding a frequency through which they have immedate access to us.

Mr. MEADER. Any airplane in the same vicinity would be on the same frequency—a commercial plane—would it not?

Captain SMITH. If it were an airline aircraft. Yes, sir.

Mr. MEADER. Is that also true with general aircraft? Would they be using the same frequency also?

Captain SMITH. Yes, sir. In many cases. En route they would be. They are some times when ——

Mr. MEADER. Does the military contact the same ground station that you contact but on a different frequency?

Captain SMITH. They are set up on spectrums. The military frequency, for example, is on the ultrahigh frequency. Ours is in the very-high frequency, and there is a separation here. So the way CAA handles it is you take a very-high frequency, take 121.0, for example. This may be paired with an ultrahigh frequency of 126.52, or something like that, just to use some figures. The one controller on the ground has both of these frequencies available to him through

a jackbox. He can transmit on both frequencies simultaneously or individually. He can receive on both frequencies simultaneously or work the jackbox to turn one off or to put the other on.

This basic pairing of frequencies was set up intentionally. What it did inevitably was bring about a process whereby we could not communicate with each other, and we have no way of knowing of the presence of other aircraft.

Mr. MEADER. The equipment on your plane, for example, could not get this ultrahigh frequency?

Captain SMITH. No, sir. We do not have any of that equipment aboard.

Mr. PLAPINGER. What is the reason for the separation of civil and military frequencies?

Captain SMITH. One is the frequency spectrum was allocated to the military and we are not permitted to use it even if the company wanted to buy the equipment.

Mr. MEADER. The counsel's queston is, Why was that done?

Mr. PLAPINGER. When was it done, incidentally? Is that something new?

Captain SMITH. No. This has been going on for quite a few years. Primarily since the military started getting into the higher altitudes, which would be in the last 7, 8, or 10 years.

Mr. PLAPINGER. Would there be security matters involved here possibly?

Captain SMITH. I do not believe so. Of course, I never know about that.

Mr. BLATNIK. Security would not be much of a factor. It would be available to anyone who has access to that frequency. I am guessing as to the reason, but one reason would probably be they do not want to have the frequency cluttered up with a lot of other conversations giving directions and keeping them from having contact with their own operational military aircraft.

Mr. PLAPINGER. But I understood Captain Smith to say no one else would have access to that frequency.

Captain SMITH. We have no authority to use it.

Mr. PLAPINGER. Could you go out and buy a set which would permit you to tune in to that frequency?

Captain SMITH. You are now getting into an area in which I could not really answer because I am not familiar with what is available. Possibly Mr. Lawton would know the answer to that, but we do not have it at all. We would like it, because this would give us wider frequencies and give us a system where you can cut down on some of your overlap of frequencies. We do not have enough frequencies even though I have a 300 frequency receiver in my airplane.

The main and basic purpose here is that communication has been designed out of the system. Fortunately I think it is being brought back in. We just say, "Let's get with it faster and come up with a procedure that lets people know when others are in the immediate area." This is the primary contributing factor to practically every mid-air collision that happens. You just do not know it is there.

3. AIR TRAFFIC CONTROL PERSONNEL PROBLEMS

The need for additional properly trained air-traffic-control personnel, we believe, has been slow to be recognized. This shortage is fundamentally caused by the lack of adequate funds and the best procedure for using available funds. Even now, although training of air-traffic controllers is going on, there are some areas where this training money is not being used efficiently because of the high turnover of personnel due to the low salary scale of starting positions. For example, it is impossible for a family man to start in the lower grades in the Chicago area and other areas because of the high cost of living. Many men, upon transferring to the Chicago area, or other high-density areas, find it impossible to live at the starting salaries and they leave air-traffic-control work. We believe it will take congressional pressure to improve this condition. We have been unable to obtain the necessary revisions of the salary scale through means at our disposal.

This is a problem which bothers us very much. We are losing more and more of our experienced controllers out of high-density areas because of the grade system which permits them to go into a low-activity area and make the same money for doing maybe one-tenth of the work. It is readily understandable why he takes this out, and I can assure you if I were in his position I would do the same thing.

But, on the other hand, where people are handling 10 and as many as 50 times the movement of a controller in a low-activity area, we believe this should be made advantageous to them through the process of a better pay scale and a little better working conditions. Also, bearing in mind the fact that this man puts in a 8-hour day under some of the most serious strain you could ever imagine. If you have ever had the opportunity to get into one of these control towers at Washington, or Chicago, or New York, for example, or at the centers, and see these people working, I think you would readily agree that somebody doing one-tenth of that work and making the same amount of money and living in a lower cost area, so to speak, would create a rather serious inequity.

Mr. PLAPINGER. Are you familiar with the efforts of the CAA to remove inequities in salary and grade scales?

Captain SMITH. We have worked with this thing but not worked direct with CAA on this, because we find ourselves in a unique position. We do not believe you can overpay the controllers. We believe they are a vital part of our industry. We need them, and we know there is a lot of work on them. As I understand it, Civil Service still classifies these men along the lines of being a secretary. In many cases they control equipment valued at millions and millions of dollars and they have lives of literally thousands of people under their jurisdiction.

Mr. PLAPINGER. These people are subject to the classification system the same as lawyers, economists, engineers, and other professionals throughout the Government. It may be that their starting

salary is low according to your lights, but I think it is really not entirely accurate to say they are classified the same as secretaries.

Captain SMITH. This is the way we get the story. I will agree with the statement that it is not fair to say they are classified that way. I do not believe they should be. Maybe this is not the proper term—"secretary." But the point is that the inequities that are within the grade structure, whether it is a grade 10 or 11, is that they merely set a rate and attach a figure to it under a certain set of rules, and we believe it is wrong to do it without taking into account the work they do. There is no incentive for the man to begin with. Certainly, human nature being what it is, only in rare cases will you find people who do 10 or 20 times the amount of work necessary to make the same pay as someone else. It just does not work out.

Mr. PLAPINGER. I am not entirely clear as to whether you are attacking the entire Classification Act?

Captain SMITH. I am attacking the philosophy that brings these people into the high-cost areas where the cost of living is the highest and requires the man to do considerably more work and live in a higher cost area and get the same money as somebody over in some other place.

Mr. PLAPINGER. I think your criticism that some controllers in an airport handling one-tenth of the traffic are rated the same as the controllers in an airport handling 10 times the traffic is valid. But some of those inequities have been worked out by CAA, I will not say expeditiously, because as far as we know it has been going on since 1953 and they are still in the process of working out further disparities in the salary structure, but something has been done.

Captain SMITH. I will agree with this but the only point we make is more inequities should be eliminated. Otherwise your turnover problem is going to increase; and you do not train a controller in 60 or 90 days. This is a 2- or 3-year job of training.

Mr. MEADER. I would like to ask you another question about these warning centers. You said you got weather information from them sometimes.

Captain SMITH. Yes, sir.

Mr. MEADER. And they advise you where there were hailstorms, and so on. They must have direct communication with you then, do they not?

Captain SMITH. Yes, sir.

Mr. MEADER. In their plotting of the location of these various planes, would they not be likely to be aware of a potential collision?

Captain SMITH. Yes, sir.

Mr. MEADER. Do they ever give any warning on that?

Captain SMITH. Oh, they will point out the position of some other aircraft, but what you are getting into is a liability problem here and a legal aspect that causes them not to offer this information because should they offer it and then a pilot, for example, accepts his suggestion and becomes involved in a collision this would automatically cause that controller down there to be subjected to some liability criticism.

Mr. MEADER. I am not talking about the traffic control at CAA now.

Captain SMITH. No.

Mr. MEADER. I am talking about the Defense people.

Captain SMITH. So am I. The point is the way the procedures are set up this is one of the problems we have with traffic control; that if they would take some of the legalities and technicalities out of it we could all get along much better. But this problem was recognized when the procedure was first set up. There is no responsibility assigned to that military man at the Air Defense Command site causing him to effect traffic control service. There has been no procedure worked out whereby this responsibility aspect can be taken care of.

Mr. MEADER. Would you think it would be possible?

Captain SMITH. This is what we are advocating. We are saying that it is possible.

Mr. MEADER. Then in other words these Air Defense Commands have very similar facilities and capabilities to the traffic controllers.

Captain SMITH. I can only go by the statement that General LeMay made to us wherein he assured us Air Defense Command radar could do the job for traffic control. If it is good enough for him to make that statement I will accept it. CAA on the other hand takes the other position. Meanwhile we gain no improvement from it.

There is a lot of this radar around the country today and with very few exceptions the entire country is blanketed with it. and it is readily available.

Mr. MEADER. And you think it is feasible to work the Air Defense Command centers into giving position information and better separation of aircraft?

Captain SMITH. We believe that procedures getting the CAA controllers in there to work out the traffic control procedures could be effected if the problem were attacked.

Mr. MEADER. Do you know whether any serious thought is being given to that possibility by CAA, or the military, or any discussion going on?

Captain SMITH. The latest information I have on that is in connection with a talk General LeMay gave at the Press Club a couple of weeks ago when he was asked the question, why is the Air Defense Command radar not being used by CAA, and he said his answer was to the effect that nobody is asking for it.

We now lead into the airports, which in my opinion is one of the biggest bottlenecks today.

4. AIRPORT DEVELOPMENT PROBLEMS

In May of 1952, the President's Airport Commission with Gen. James H. Doolittle as chairman, reported its conclusions. One of the conclusions reached was as follows:

> **The Civil Aeronautics Act should be amended to require certification of airports necessary for interstate commerce and to specify the terms and conditions under which airports so certified shall be operated. Certificates should be revoked if minimum standards for safety are not maintained. Closing or abandonment of an airport should be ordered or allowed only if clearly in the public interest.**

The CAB and the Department of Commerce did not concur in this recommendation because as they state they believed that most of the objectives sought by the recommendation could be achieved under

existing authority. We question the CAA and CAB viewpoint because of the following reasons:

(*a*) The CAA and the CAB have no requirements for crash and rescue facilities at any airport in the United States. This vital factor of safety found so necessary in each community is entirely left to individual initiative. Not even a guide or a technical standard order exists which the CAA can recommend to interested airport operators.

(*b*) They have no requirement that instrument runways or any other runway must have runway marking even though the technical standard order for such marking has been in existence for many years and detailed facility requirements for ILS approaches are spelled out by the CAA. As we try to increase safety on the airlines a requirement for minimum standard runway marking on instrument runways seems to us to be obvious.

(*c*) The CAA has no requirement for minimum coefficient of friction criteria for airline airports, nor does it have rules or regulations for the wearing qualities or maintenance standards for the runway surface. This lack of adequate criteria on this one subject has cost the Government and municipalities a great deal of money in the past. For example, because of not technically evaluating the difference in runway usability between a concrete runway and black-top surface in a new runway at O'Hare, in which much Federal money was spent, 8,000 feet of that runway will now be overlaid with concrete in order to make it suitable for jet age operations even though this runway has been in use for only a little more than a year. The inadequacy of drainage on this runway and the lack of construction criteria resulted in a direct loss to the Federal Government and the city of Chicago.

I might point out this is not the only place this is happening.

Mr. MEADER. What was wrong there? Should they not have used asphalt or black top on that runway expected to be used by jets?

Captain SMITH. That is what they did use, and it did not hold up, sir. This has been known for a considerable period of time. The point here is that CAA enters into an agreement to permit Federal aid to go into an airport. They are certainly well aware of the deficiencies of the airport, and to go and permit Government money to go into an 8,000-foot runway to do a job for them which you know will not meet the criteria is rather questionable in our view.

Then they come back and have to pour additional Federal-aid money into it to overcome the initial error. They are just getting into the practice of throwing good money after bad.

Mr. MEADER. But every one of these complaints you make here probably could have been met by exercising the authority that the Government has in withholding funds in Federal aid. They did not need to have the right to certify airports in order to accomplish any of these things. Is that not correct?

Captain SMITH. The point here, Mr. Meader, is that a community understandably will attempt to do the job at the lowest possible cost. No one quarrels with this if the project as it is planned will do the job when it is completed. CAA and the city of Chicago were clearly advised not to put this material on this runway by us. We told them it would not hold up.

Mr. MEADER. All I am getting at, Captain Smith, is simply this: The so-called Doolittle report has recommended that airports in interstate commerce be certified. That would be one method of achieving an objective. Another method is the granting or withholding of Federal-assistance funds.

Captain SMITH. Correct.

Mr. MEADER. But your complaint is not that the withholding of funds was an inadequate means of achieving the end. It simply is that your complaint really is, or should be it seems to me, that the Civil Aeronautics Administration, and specifically its Office of Airports, did not have criteria or standards which they followed in the allocation of funds. They gave funds to O'Hare Airport for a program which, as you say, they should have known was not a good one. If they had simply withheld the funds and said, "We do not give you any funds unless you do something that is sensible, or meet certain standards and criteria" they could have accomplished the end just as well as through the certification procedure, could they not?

Captain SMITH. That is correct. All we are really taking issue with is the fact that CAA has not established criteria on which to predicate an acceptance or rejection of a proposal.

Mr. MEADER. Yes. I noticed you made one more point there on runway lengths, but you do not say anything about separation of airports in a terminal complex, and I would like very much to have your comments on that particular subject.

Captain SMITH. Right. I have a note here to get into this area, but the point on this runway thing is that anybody familiar with the operation of these heavy aircraft, particularly military—we have gained a lot of information from them along with the work we are doing ourselves—knows that putting asphalt in for jet operations just will not do the job. I saw the runway at Memphis go to pot in about 4 weeks with asphalt.

Mr. MEADER. Does the blast have anything to do with that?

Captain SMITH. That is part of it.

Mr. MEADER. Or the weight?

Captain SMITH. And there is the weight. Also there is a tremendous static problem on these airports, particularly when you park them. You have airplanes grossing up to and over 300,000 pounds.

Mr. BLATNIK. We will have a brief recess so that the Members may answer the quorum call on the floor. The House goes into session this morning at 11 a. m. We will return and continue with your testimony, as we would like to complete the hearing this morning.

(Whereupon, a recess was had.)

Mr. BLATNIK. The Legal and Monetary Affairs Subcommittee will resume the hearing of testimony presented by Captain Smith of the Air Line Pilots Association.

Captain Smith, I believe you were just beginning your airport development problems on page 3, down at the bottom of the page, on the lack of CAA requirements for runway surfacing.

Captain SMITH. Yes, sir. If I have answered Mr. Meader's question that he raised on this point, then I will continue, starting over on page 4.

Mr. BLATNIK. May I just ask one question. I am interested in this because I had experience at the airport in Duluth. You say there is no criteria laid down by the CAA, but they do have to approve the final specifications for any improvements on an airport before that local project is eligible for the Federal grants. Is that not true?

Captain SMITH. Yes, sir.

Mr. BLATNIK. How is that done? Is that by a guess and by gosh method? Will it vary from airport to airport, from locality to locality? They may feel certain requirements for subsurface drainage may be completely adequate, let's say, in Arizona; and they have entirely different criteria or requirements for, let's say, an airbase in a cold——

Captain SMITH. Well, I am quite certain there are many facets that go into consideration of a runway construction. Idlewild, for example, you have to surcharge it for about 9 months before you can lay any concrete. And out West you may be able to start right out laying it. Minneapolis was able to put in a runway there very quickly because of the fact this subsoil and all those matters were in pretty good shape. The basic point we are interested in, though, is that, regardless of the location, we are still faced with the problem of stopping an aircraft and also insuring, particularly getting into the jet operations, that we don't have foreign substances whipping up through an engine on a takeoff, for example, and do a minimum of a quarter of a million dollars damage on the engine as well as affecting the safety of the flight. So the related problems of what is underneath the concrete in order to maintain the stress, we are interested in; but we are also specifically interested in the fact that on asphalt, for example, when it gets wet, it is considerably slipperier than it is when it is dry. Its longevity—of not sustaining a continued operation of heavily loaded aircraft—this has been a problem. And where it is obvious these types of aircraft will operate, we also think it should be quite obvious that CAA should insist that concrete should be used on the runway surface. Invariably—Memphis is a good example—I have talked to the airport operator down there. He put in asphalt just for evaluation over a period of time; and from 4 to 6 weeks, it was breaking up and he had to get out there and resurface the runway.

Mr. BLATNIK. We had that happen at the Duluth Airport. Minneapolis is not a problem, but in Duluth we have a lot of mesquite and a lot of water has to be drained out. There again we had the airlines, and particularly the airport manager, insisting on concrete for the aprons; and the CAA people argued that the black top was sufficient. And it all gave way; the wheels sank almost to the hubs. I did not realize there was so much stress at the one point.

Captain SMITH. When the aircraft is parked, the load on the surface is more than when it is moving or even on the initial touchdown.

Mr. BLATNIK. So the black-top apron broke through in several spots by the aircraft and had to be torn up and redone in concrete.

Captain SMITH. This is the point we are trying to make.

Mr. PLAPINGER. Are you saying, Captain Smith, that jet operations or no, concrete is superior, more desirable than asphalt?

Captain SMITH. From a braking efficiency standpoint, which we as pilots are vitally interested in. It doesn't do any good to get on the runway if you can't stop.

Mr. PLAPINGER. The CAA tells us at our last hearings that they found either portland cement concrete or asphalt equally desirable, serviceable, and effective, but there was possibility in view of the jet spillage problem that they might find one more desirable than the other. They have indicated in their Jet Age Planning No. 2 that, in areas where spillage is likely to occure, it is desirable to provide a pavement resistant to jet fuel. As far as you know, they have not recommended for jet operations that portland cement concrete be used?

Captain SMITH. No, sir. In addition, the two runways at Newark Airport today are asphalt; and periodically semiannually, or somewhere along that time period, they are closed to take the wrinkles out of them and repair the spots that are warped or cracked.

Mr. PLAPINGER. This doesn't happen with cement or concrete?

Captain SMITH. No, if it is stressed properly initially. We just haven't found—this runway at Newark is a new one. And, incidentally, I might point out that an average runway today runs a million dollars a thousand feet.

Mr. PLAPINGER. Is that of concrete or asphalt?

Captain SMITH. This is an overall broad average, regardless. This is a fair average it will roughly come out to.

Mr. BLATNIK. Do you have any figures on what it costs to lay in the original black-surface runway and replace it by concrete?

Captain SMITH. I don't have that with me, sir. We have it in Chicago at the home office. We have lived very closely with this thing.

Mr. BLATNIK. I'd like to get those figures, and I will ask counsel to confer with CAA on these costs.

Captain SMITH. We will forward it.

Mr. BLATNIK. Do you have any other examples of other airports where the same type of thing has happened? It seems to have been going on for over a period of years.

Captain SMITH. Of course, in Memphis is the latest one, where they have just experienced the problem. They put this asphalt down on their whole runway—it's a 9,000-foot east-west runway—and it broke up. The amount of heavy aircraft at Memphis is very small.

Mr. MEADER. Captain Smith, what is your explanation of why this is permitted? Is it a lack of standards adopted by the CAA, where they let everybody know they will not put Federal money in unless they meet certain standards; or is it perhaps deficiencies in the personnel in the Office of Airports that do not study these things carefully enough, or do not use good judgment in allocating Federal funds? What is your explanation as to why these airport deficiencies are permitted to occur?

Captain SMITH. I can only speculate in answer to your question, and I think it stems primarily back to the fact that there is no criteria out like specifically what may or may not be used. As far as we are concerned, asphalt should just be outlawed.

Mr. MEADER. Do you think it would be possible for the CAA to adopt certain standards for airports?

Captain SMITH. We have been urging this for years. We want to go even further than that to where, from our standpoint, our com-

mercial operation, there should be a minimum criteria governing the equipment and facilities that the airport itself is required to have. They have never set this up, and we have never received any support on the thing. Today there is no requirement on an airport—runway length, runway stress. We as pilots are working closely with airport operators all over the country, trying to get improvements on the runway, trying to get paint on the runways, so we can see them at night better. Each one is like going out and pulling a tooth.

It took us 10 years at one airport to get an improved operating limit, because people wouldn't clear the trees off of the end of the runway. Finally, after a long negotiation of pointing out that we were still interested in getting this minimum lowered so we could provide a more reliable service, somebody told us that, if we cut the trees down, they'd go in and get them out of there. I told them to get a bunch of saws and we'd get the pilots and go out there and cut them down. The next morning I got a call from CAA that they'd go out and get the trees out of there.

Mr. PLAPINGER. Where was that, Captain?

Captain SMITH. Cleveland.

Mr. BLATNIK. Captain, we will proceed, I think, on the top of page 4.

Captain SMITH. Starting over on page 4, referring to standard runway lengths:

> For each category of airport, a standard runway length has been established consistent with its future planned use. Airports should bring their runways up to the standard. For intercontinental or transcontinental airports, the length of the dominant runways should be 8,400 feet with possibility of expansion to 10,000 feet if later required and with clear approaches as per recommendations 4 and 5.

Now, this paragraph I have just read is a conclusion to the Doolittle report.

As recently as July of 1954, the CAA said that available data indicates that 8,400 feet will suffice for a substantial number of years. Now the existing TSO–N6a is being proposed for revision by the CAA to a maximum length of 10,500 feet for international express airports and it seems like these lengths are very minimum for coming jet aircraft needs. This TSO revision is still in the draft stage. Jet aircraft are expected to be operating out of many of our large airports before the end of the year. Still, we are working with criteria that are obsolete. This is one example of governmental planning being very late and marginal. Present criteria meeting Federal aid for runways is very difficult when the runway will be in excess of 8,400 feet. This is the arbitrary length that CAA usually chops off their funds. We know now that we need minimums of 12,000 feet of runway to operate our international flights.

Mr. PLAPINGER. You mean that 10,500 feet isn't sufficient?

Captain SMITH. That is correct. TWA has come out and stated that, on a nonstop flight from Chicago to Paris, they will require a minimum of 12,500 feet of runway.

Mr. MINSHALL. We had some testimony, Captain, before this committee only a week ago from the airport people and CAA, saying that 10,500 was adequate; and it backed up the statements that were made by the engineers of Boeing who testified before this committee 2 years ago. What has changed that so drastically?

Captain SMITH. I think people started reviewing the operation and they became a little bit more familiar with it. This 12,500-foot figure is not ours. This is what the airline that is operating the airplane says it needs.

Mr. PLAPINGER. This is nonstop from Chicago to Paris?

Captain SMITH. Correct.

Mr. PLAPINGER. How about nonstop from New York to Paris?

Captain SMITH. Approximately the same. The jets will be operated at Idlewild within approximately 30 days, and we have been having meetings on this the last couple of weeks and we are seriously concerned that we can even get gross-load aircraft out of there. We will probably have to penalize the payload in order to operate the airplane.

Mr. PLAPINGER. Suppose you stop at some other place, would that require less runway?

Captain SMITH. I think once you start stopping this airplane en route along the routes you are operating piston aircraft, you have lost the operational advantage of the tremendous investment. This is an expensive airplane. You're getting into a piece of machinery that costs in the neighborhood of $7 million, and you can't degrade it by making unscheduled stops just to refuel.

I would like to point out that you don't build the runway in 3 or 4 weeks. One of the constant complaints I have heard from the airport people is that nobody has given them specifics as to what they need in the way of stress, runway length, problems related to spillage and drainage and things like that; and consequently we are getting into the jet era without a real good operations airport in the United States.

Mr. PLAPINGER. Do you think this is a deficiency in the CAA, the manufacturers, or where? Now, when the manufacturers appeared before us in 1956, we were told that the jets could operate from existing runways. Earlier this year, the CAA told the Appropriations Committee that there would only be a 10- to 12-percent increase in runway lengths required. Before that, in one of their jet age planning surveys, they said 5 to 7 percent. Now they tell us 25 percent. Where do you think this disparity or deficiency in operation occurs? Is it the manufacturers? How can CAA know what the requirements will be, in the absence of operating the plane, for instance, which they have not done until recently?

Captain SMITH. I think you are getting right down to the nub of the problem, Mr. Plapinger, in pointing out that in all fairness to CAA they weren't given the accurate information they needed, along with the airport operators.

Mr. PLAPINGER. Who should have given them the information?

Captain SMITH. The manufacturers. In fact we attempted to——

Mr. PLAPINGER. Is it the manufacturers or is it the airline operators? Is it the use of the airplane that dictates the longer runway lengths?

Captain SMITH. It's the weight. Initially these airplanes were anticipated to have an allowable gross load in the neighborhood of 225,000 pounds. Now that neighborhood is up close to 300,000 pounds. When this airplane first presented itself, we made numerous attempts to gain accurate information on runway lengths. Naturally, we are most interested in it. We brought this up at Montreal.

Mr. PLAPINGER. When was this?

Captain SMITH. Last year. We attempted once again to gain specific information concerning requirements, and we never at any time received any information that would indicate what kind of runway length we would use. It was not until the TWA came out and made the definite statement as to what their specific requirements would be.

Mr. PLAPINGER. Now, how did they arrive at their requirements?

Captain SMITH. They set up an evaluation team that was headed by one of their airline pilots who went out and reviewed the entire operation of the aircraft. They approached it from an operating standpoint. They worked out all the figures. They assumed how they would have to operate the aircraft, the limitations they would be under; and then they came up with a very good outline of exactly what they needed. Other carriers have done this.

Mr. PLAPINGER. Has that information been made available to the CAA, would you know?

Captain SMITH. The CAA, I believe, has it. I know these were public statements they issued.

Mr. PLAPINGER. I don't mean the public statements. I mean the data upon which the public statement was based.

Captain SMITH. I believe so; yes.

Mr. MEADER. Here 2 years ago, we had engineers from Boeing Aircraft, Douglas, Convair; and if the engineers or the manufacturers gave to the CAA the same information that they gave to this committee, and they haven't changed that information in the meantime, it is kind of hard for me to find any deficiency on the part of CAA Office of Airports in not anticipating this longer runway length which you say is now going to be required. It seems to me the manufacturers or someone should have made some studies long ago about this matter and given the necessary information to the Office of Airports. Who is really to blame for this, if you know?

Captain SMITH. You bring up a very good point, and I would agree with your assumption if, we must accept the fact, this type airplane was not in operation today and there was no place to go except to the manufacturers and use their figures, be whatever they may, to attempt to define the problem. However, if you will bear in mind that the military for years has been operating aircraft quite similar to the ones we are putting in service, and you will bear in mind the runway lengths they are using and why they built the runways that length——

Mr. PLAPINGER. What are the lengths?

Captain SMITH. They are anywhere from 12,000 to 15,000 feet. There was ample information available on this equipment, which clearly indicates that 8,400 feet, for example, would not be enough and that 10,000 feet would not be enough.

Mr. MEADER. Are you saying that the CAA officials, and particularly those in the Office of Airports, should have made an investigation of Air Force's experience with jet bombers or whatever planes might be similar to what the commercial jets are expected to be?

Captain SMITH. I would say that, when it became obvious that they were not receiving accurate information that they needed to establish a program, it would have been quite fruitful to have gone to some other source where the information was readily available

which could be used as a basis for determining what has to be done and where.

Mr. MINSHALL. Wasn't it the same manufacturers making the military ships that are making the commercial ships?

Captain SMITH. This is correct. But I would like to point out that a lot of these runway lengths that were given were in conjunction with manufacturers' figures as concerns performance. This airplane has not yet been certificated. There are a great number of assumptions——

Mr. MINSHALL. You would like to put the blame on CAA rather than the manufacturer for coming up with the wrong specifications?

Captain SMITH. I don't like to be put in the position——

Mr. MINSHALL. Whose fault is it?

Captain SMITH. It is a combined industry and CAA lack of appreciation of the problem.

Mr. MINSHALL. Well, CAA doesn't come into it other than——

Captain SMITH. They are all part of it. CAA has the responsibility for——

Mr. MINSHALL. You would also be at fault for not being alert, would you not?

Captain SMITH. We have been alert.

Mr. MINSHALL. When did you first bring it to the attention of the CAA and the manufacturers?

Captain SMITH. We have been doing this for over 3 years. I delivered a paper myself in Boston and pointed this subject out and at the same time said from our standpoint operationally we do not have a good airport in the United States.

Mr. MINSHALL. But you had never flown a jet at that time. You knew none of the requirements. How could you, 3 years ago, come out with a statement and claim to know more about it than the engineers and designers?

Captain SMITH. We have a very large percentage of our membership flying jet aircraft. I had a boy working with me—unfortunately he dropped dead—a copilot for American Airlines, who had had a tremendous amount of B–47 experience.

Mr. MINSHALL. Did you make these facts and figures known to engineers at Boeing, at Convair, and other manufacturers?

Captain SMITH. The only facts and figures we could make available was the point we couldn't agree with them. One way of putting it would be that they are oversimplifying the problem. This is being proved as time goes on. You are getting indication that these runways will have to be longer. There's a half billion dollars of Federal airport aid coming out to start stretching these runways. When you figure that this is an airport matching program, it is obvious there is a need for improvement.

Mr. MINSHALL. How many airports have the facilities to expand to 12,500, as you recommend?

Captain SMITH. I couldn't give you an exact figure on that. There are quite a few.

Mr. MINSHALL. How many of them have 12,500 feet?

Captain SMITH. Very few. Idlewild, for example, can extend one runway to 14,000 feet. They are presently adding on 1,800 feet. By next summer they will be able to operate the airplane at a gross load off one runway.

Mr. MINSHALL. Have you flown one of these new jets?
Captain SMITH. No, sir.
Mr. MINSHALL. Have you ever flown a military jet?
Captain SMITH. Yes, sir.
Mr. MINSHALL. Transport?
Captain SMITH. No.
Mr. MINSHALL. Where do you get your information then?
Captain SMITH. I get information from the pilots who are operating them.
Mr. MINSHALL. Who are they? What pilots are operating them—the military?
Captain SMITH. Our airline pilots still in the Reserve flying, boys in the National Guard. We have a direct liaison with the British boys flying the Comet and other similar type aircraft.
Mr. MEADER. How about runway strengths for the jets? Will the runways require greater strength?
Captain SMITH. In some cases they will. It depends on what their capacity for stress is today. I think the majority of runways that are being built are bearing a capacity of 300,000 pounds. This is a fair figure for possibly the next 10 years. In other areas, Newark, for example, we have an operating limitation of 220,000 pounds.
Mr. BLATNIK. Do you think, Captain, you are now approaching a state where limitations may be placed on the weight of the aircraft and other performance and other characteristics?
Captain SMITH. This is an absolute reality. There is no doubt about this in our minds whatsoever. We are concerned right now with the Idlewild Airport in its present configuration of being able to get a jet aircraft from New York to Los Angeles nonstop in the summertime without restricting payloads on that aircraft. The carrier has already accepted this problem.
Mr. BLATNIK. You see, we have that problem in the highway program. I think there is something of a similarity. We could not allow trucks or buses to go unrestricted in size and weight. Then we would have to build the entire highway system to meet those maximum dimensions in weight, so the maximum becomes the minimum requirement for the overall system. It would be exobitant, terrifically expensive. States have done that, of course, for some time, on the weight, axle load. We have no such limitations control now in airports. Any time a new aircraft is built, then the move is to get more money from local, State, and Federal sources to have the airport catch up with the performance of these new aircraft.
Captain SMITH. This is correct. I think this puts a tremendous burden on the average community because you are talking about big money. They have to go out and obtain money through bonds or other means to bring about this construction; and this is a constant complaint we receive from the airport operators, that it is becoming more and more difficult to get the appropriate budget to even match the Federal aid.

If anybody wants to sit and tell me that we can operate these jets at the anticipated allowable gross loads that they are talking about, with their present airports, they are just indicating a very misleading manner in which these airplanes will be flown.

Mr. BLATNIK. Captain, you said there is only one runway at Idlewild that has been completed to an extension of 1.800 feet which would be adequate for a full load for jet takeoff.

Captain SMITH. This is a small 707.

Mr. BLATNIK. A 707. In short, how many such runways do we have in the country out of five-hundred-and-some-odd airports?

Captain SMITH. The latest figure I have—and this has not been brought up to date for maybe 6 or 9 months—is that there are approximately 12 to 14 airports in the United States which will have at least a runway available that can be used to the maximum advantage of the aircraft

Mr. BLATNIK. In short, then, there are 12 to how many?

Captain SMITH. Fourteen.

Mr. BLATNIK. Usable in part?

Captain SMITH. Right.

Mr. BLATNIK. Available in part for use by jet transports?

Captain SMITH. This is correct.

Mr. MINSHALL. Captain, I have here a chart that was submitted to us 2 years ago by Mr. Howell, Director of Airports. And this shows the indicated jet aircraft performance at large airports, and it shows here in the column marked "Maximum TSO length (feet)" that the maximum runway length required would be one out in Denver—because of the altitude, I presume— of 11,700 feet. Now, this is information from all of the manufacturers, the engineers who have——

Captain SMITH. This is correct. If I may, Mr. Minshall, take one that I am familiar with, which is Chicago over here, where they indicate the longest runway is 8,000 feet and the maximum length needed would be 8,200 feet, I'd just like to point out again that the operator of the aircraft, TWA, has indicated——

Mr. MINSHALL. Why just TWA? What about United, Capital? Where are the other people who are going to be operating jet aircraft? Why haven't they come out with any recommendations?

Captain SMITH. One of the reasons is, when you go into the process of installing a new runway, the carriers are going to have to pay for a good part of it. If they indicate to all these communities they are going to need an additional four or five thousand feet of runway——

Mr. MINSHALL. Do you think this information given to us 2 years ago was false intentionally?

Captain SMITH. No; I don't. I think this information given probably represented the best thinking at that time. But bear in mind that these airplanes, where at first they were taking off with weights of 225,000 pounds, are now up to 300,000 pounds.

Mr. MINSHALL. Then, as a matter of fact, the weight of the airplane has changed and the thinking of that time of the manufacturers was correct.

Captain SMITH. Not necessarily.

Mr. MINSHALL. Well, you just said that, now.

Captain SMITH. No, I was trying to point out that the reason for the big difference is primarily due to the fact that the aircraft are going to be heavier. At the weight they were talking about at that time, these runway lengths would still be short.

Mr. MINSHALL. In other words, that chart is not a correct one.

Captain SMITH. That is the position I'd take at this time.

Mr. MINSHALL. In other words, the engineers didn't know what they were talking about.

Captain SMITH. To some extent, yes. They were not aware, for example, whether or not reverse thrust would be permitted in determining landing distance or whether——

Mr. MINSHALL. I think that chart is based strictly on wheel braking. There was no reverse thrust figured on those.

Captain SMITH. I don't know on what basis this was written.

Mr. MINSHALL. Because they had definitely no reverse thrust solved at that time, and I don't know that they do today.

Captain SMITH. But they had an arbitrary figure they assumed reverse thrust would accomplish. By the same token, they didn't also have adequate braking a couple of years ago to stop these things. Where did they get the figures to put into this; this information?

Mr. MINSHALL. I am not an engineer and I am sure no member of this committee is an expert on this. All we did is take the advice of what we thought were the outstanding experts in the world on this particular subject. And you come in here and say that is not good information today.

Captain SMITH. I believe the only accurate one that I can hang my hat on; 8,200 feet was given as a maximum figure at O'Hare. The operator himself says he needs 12,500 feet. This is not my figure. This is the operator's figure.

Mr. MINSHALL. This is one operator against all the engineers, against all the experts over at CAA, and——

Captain SMITH. If this is the case, yes. But the fact is, this is what the carrier that is going to operate the airport claims he needs to provide a safe, orderly flight out of the airport.

Mr. MINSHALL. That is precisely what we were trying to get 2 years ago—what are these municipalities going to need in the way of additional runway lengths, so they could make plans for the future and get ready for these jets in 1960 and 1961. That question was specifically asked and they said these runway lengths are adequate. And I specifically asked questions for our information about Cleveland; and I believe they said that, for the Cleveland operation, based on a local continental flight, by extending the runways in Cleveland a thousand more feet, it would be adequate.

Captain SMITH. This is probably a fair statement. I take no issue with that. I am talking about primarily where you are getting into the long-range operations.

Mr. MINSHALL. And, now, just a week ago, the same people came here and testified they are going to make Cleveland an intercontinental field and that 10,500 would be correct. And that was also a week ago.

Captain SMITH. Well, let's get down to another one here that you have. You have 9,100 feet maximum at New York International Airport. Right today they are adding 1,800 feet to it to make it 11,000, because that's what the carriers say they need. They are now working on an additional 3,000 feet on there because that is what the carriers claim they need. These are not our figures. These are figures presented by the people who are going to have to operate the aircraft.

Mr. MINSHALL. These are not my figures; they are from the engineers. And up to about a week ago, 10,500 feet was long enough for Cleveland for an intercontinental field.

Captain SMITH. I can assure you the carriers jointly would not run into a pact on runway extension, to get into a program of adding on close to 5,000 feet of concrete, unless they needed it, because this is in the neighborhood of $10 million they are going to have to pay.

Mr. MINSHALL. My point is that CAA, based on the information of the experts that they had available 2 years ago and as of a week ago, feel that the runway length of 10,500 feet is adequate, for example, in Cleveland.

Captain SMITH. This could very well be.

Mr. BLATNIK. Will you proceed, Captain. We are being just a little pressed for time and we expect more rollcall votes.

Mr. MEADER. I would like to skip to that note about what he said about separation of airports.

Captain SMITH. I will get down to that and run right through this as quickly as I can, sir.

Mr. MEADER. Is that in your prepared statement?

Captain SMITH. No, sir.

Meteorological equipment: New meteorological equipment for measurement of runway visibility is used in the "runway visual range procedures" and is being scheduled for implementation at the airports on the basis of the appropriation available. Newark is the only airport that has this type of equipment installed and operating. It is imperative that the amount of appropriation be increased so that the national aviation weather system planned by the United States Weather Bureau and the Department of Commerce be implemented in the shortest possible time. It is only through such action that all elements of the airway system can be used to their fullest capacity.

Airport lighting: Adequate lighting on the runways and on the approaches to the runways need to be included in the criteria for airport certification to improve the level of safety obtainable under all operating conditions. Some narrow gage flush lighting criteria are still in the process of being tested; however, sufficient criteria on runway and approach lighting are available so that the opportunity for improvement of airport lighting far exceeds the amount of money available for this work. We believe that the level of safety of operations at airports is in direct relation to the availability of modern lighting aids as well as other approach facilities and navigation aids. I think this has been recognized in the present airport aid bill, I think, that's in process.

We have heard it said that airport aid should be secondary to the development of a first-class air traffic control system. We certainly do not deny the necessity for improvement to air traffic control; however, the record is clear that the majority of accidents happen in the vicinity of airports so that it is extremely shortsighted if we in any way neglect a sound, aggressive program for the development of airport standards and criteria. It is important that we encourage the cities to develop their airports at as fast a pace as possible. It has been correctly said, we believe, that Federal aid through an enlightened program administered by the CAA can do much to foster airport development.

We do not believe the CAA has extended itself to the limit of their capabilities to provide satisfactory criteria—this is CAB; that is a typographical error. It should be: Nor has the CAA provided sufficient airport development legislation to require that adequate standards be adopted by the airport management.

These are just some of the items on which progress has been "too little and too late." With the aid of an active congressional plan, we feel sure this lack will be temporary.

Mr. MEADER. What do you mean by "nor has the CAA provided sufficient airport development legislation"? They do not pass laws, do they?

Captain SMITH. They have criteria that they set up as procedures——

Mr. PLAPINGER. You mean regulations rather than legislation, do you not?

Captain SMITH. Well, the wording here may be bad and it may be incorrect; but from an actual operating standpoint, they will set up procedures, regulations, administrative procedures. And these are in effect the criteria that are used. In the strict sense of the word, they may not be necessarily legislation; but the fellow who has to work with them is pretty much impressed with the fact that it is a law.

Mr. MEADER. Now, you were going to comment on separation of airports.

Captain SMITH. The airport separation thing, one of the reasons we didn't include it in here, Mr. Meader, is because we were following very closely the FAA bill in the Senate because this particular item was the cause of some amendments when it came out on the floor, concerning the requirement for everyone coordinating their intentions as concern airport siting and utilization, missile siting and utilization, and matters such as that. They would concern traffic control.

Our position on the airport siting problem is that it certainly has to be coordinated with the agency that is required to effect the traffic control service, and currently this would be the CAA. And as the thinking is going, and we hope will eventually come about, this should be through the FAA. It is certainly quite obvious there is a certain amount of thinking and planning and evaluating that must be done, particularly when establishing a new airport; or even the addition of runways oftentimes will require a considerable amount of work in order to assure that you are gaining what you hope to.

It is difficult sometimes to set up a specific criteria as to distances airports should be from each other. Of course, from our standpoint, the farther apart the better, because this reduces some of the crossover problems, for example, that we are experiencing in New York, which has a very adverse effect on traffic flow. But that gets into the area that you'd like to explore.

Mr. MEADER. Well——

Captain SMITH. I realize you are being pressed for time here. This is an item I can talk about for hours.

Mr. MEADER. Well, 2 years ago, Mr. Lowen, the Administrator at the time, told us that a study was being made of the holding and approach patterns for jets. Now, we understand that that study was never carried out, at least as Mr. Lowen gave the committee to understand it was going to be. He expected some results in 6 months. And

we were told by the Civil Aeronautics Administration witnesses here that, with respect to the Detroit area, a study was now going on which commenced the 14th of July at Indianapolis—a simulation study—which would be completed, I believe, the 8th of August. Now, has your association taken an interest in and informed itself about the prospective holding and approach patterns of commercial jets and the relationships between those patterns and the separation of airports?

Captain SMITH. Oh, yes, sir. They are tied in very closely. In Detroit, for example, we have two pilots working right there with all the local people, the CAA, airport operators, as well as the military people. And you're getting into an area where there is a most serious problem; namely, if the procedures used in holding these jet aircraft do not result in air speed somewhere near what we are using today, this is going to require in many cases numerous revisions to the traffic-flow procedures. The effect of having to revise these holding pattern areas, for example, will in many cases thoroughly disrupt any sense of normal traffic flow. The philosophy right now is to get these jets out of the terminal area and not to hold them there at all, because of this unknown on the speed, and rather hold them 50 to 75 miles out from the terminal area, ladder them down to the lower altitudes out there, and bring them on in with radar. Now, what would happen in the event the radar was not available, we don't have the answer to yet. We have been working on this problem. We had a briefing with CAA up in New York the other day and my impression is that we have no set criteria for handling the jet aircraft today. In many respects the jet aircraft will be no different than the other. But if we have to use high speeds in a terminal area, then we have a very serious problem.

Mr. MEADER. The only statement we got from Mr. Pyle was a rather general one which is as follows:

> As the traffic pattern is extended for the larger and faster aircraft, it is necessary that more distance be provided between airports located in a terminal complex.

Would you have any quarrel with that statement, Captain Smith?

Captain SMITH. Well, this is a nice position to be able to take; but sooner or later you have to own up to reality, and the fact is that the jets will be operated into Idlewild Airport initially and Idlewild will still be the same distance from LaGuardia as it is today. And we will have the same kind of traffic flow in there. When you are getting around to establish a new airport, sometimes you can work out the answers pretty much along the lines that you desire. But in many cases——

Mr. MEADER. Wouldn't you say the same thing applied perhaps not as clearly, to the expansion of an existing airport?

Captain SMITH. Oh, very definitely.

Mr. MEADER. I mean if you are going to spend $35 million on an airport which was only 8 miles away from other major airports, wouldn't you think you ought to give some study to whether or not both airports could be used by jets?

Captain SMITH. I'd assume that, prior to the time any Federal aid were permitted to go into that $35 million venture, somebody would have the answer as to whether or not they would get the money out of it.

Mr. MEADER. Well, I cannot help but agree with you. The only thing that seems sensible to me is that the study ought to precede the expenditure.

Captain SMITH. I agree with you. This is the same type of philosophy we tried to bring across in the matter of runway lengths.

Mr. MEADER. I don't want to misquote the testimony, but I pressed Mr. Pyle on whether or not their study of the holding and approach patterns of jets could not come up with some standards of separation of airports in a terminal complex; and the best I could get out of him, beyond this general statement, was that you had to look at each case by itself, that it was impossible to come up with any criteria. Do you agree that it is impossible to come up with any criteria about separation of major airports in a terminal complex?

Captain SMITH. I wouldn't say it is impossible. I usually take kind of a dim view of using the word "impossible" in connection with aviation, because I feel in many respects we have been doing the impossible for the last couple of years. It may be difficult and it may require some thought; but particularly when you get into the areas of assuring runways at the two airports will be wherever they are situated, and getting in and making a good crystal clear study of the thing, I think you could come up with a rough outline as to what would be permissible. I think you certainly would come up with some answers that clearly indicate there are certain things that should not be done. For example, you wouldn't have a runway at one airport running north and south for your instrument operation and put another airport 4 miles east of it and have that runway perpendicular to the other one.

Mr. MEADER. You would not have them so they are converging 19 miles from the airport either, would you?

Captain SMITH. I would not, but some other people have. This is the problem we have at Idlewild.

Mr. MINSHALL. Mr. Chairman, very briefly I would just like to have this in the record, that Mr. Howell, when he testified before our committee 2 years ago, prefaced his remarks as to runway lengths with this statement:

> We have, strictly on the basis of manufacturers' data, made a quick summary of the large hub airports.

So that chart was based strictly on manufacturers' data and no other facts or figures were considered.

Mr. PLAPINGER. This is the chart on page 443 of the printed record of our 1956 hearings.

Mr. MINSHALL. That is correct. And the statement that preceded it is on page 441 of that same record.

Captain SMITH. If I may just add to that, I would like to point out the fact that we as an association are not trying to take issue specifically with the charts or information that have been used previously. However, it still gets down to the basic fact that somebody is responsible for administering Federal airport aid money; and it just seems sensible, in an effort to be able to conduct your business in an orderly manner, that you have a pretty good picture of what you are spending your money for. Where the chips fall, or what the cause, is not my concern. I am a victim of it. That is the reason we feel so strongly on this point.

Mr. MEADER. Well, of course, that is this committee's concern. If there has been a lack of efficiency and good sense in the expenditure of public funds, that is precisely what this committee is supposed to look into. I should think you would be concerned about it, too.

Captain SMITH. We certainly are. We have pointed out that 80 percent of the Federal aid in Idlewild goes into the terminal building. Yet we don't have proper requirements for a jet operation. We have no control over this, but it seems appropriate to pay similar attention to the operational needs of your going enterprise in order to assure that you can properly use it.

Mr. MEADER. Having listed all these deficiencies in the airport program, are you concluding that the Office of Airports, at least, of the CAA, has been very weak and inefficient?

Captain SMITH. We have not attempted to hide our feeling in this matter. Actually the one point that we would like to leave with you—and it is the reason this particular paper has been presented this way—is that we take violent exception to the position that the airport problem is secondary to the air traffic control problem. This just cannot be. We've got the traffic capacity today and the knowledge and the techniques to saturate any airport in the United States in an hour. This is not a problem today with the traffic-control system. The reason we have the problem here in Washington is because of the airport. You just can't put any more airplanes on the concrete. I refer to it as trying to put a quart into a pint. And you have seen the delays that you run into out here. I flew a trip through here on Monday night and sat on the end of the runway 40 minutes without a clearance. This had absolutely nothing to do with the deficiency of the traffic-control system.

Mr. BLATNIK. Forty minutes on the runway?

Captain SMITH. If you have no objection, I would just point out in this line that we had six airplanes return to the gate at Idlewild last Monday because they experienced mechanical malfunctions as a result of idling for upward of an hour and a half, waiting to take off.

Mr. MINSHALL. Capital ships?

Captain SMITH. Not there. These were other aircraft. You just can't sit out on the runway with these compound-type engines there for an hour at idling speed. Your plugs will foul up, your engine life will be adversely affected. This is catching up with 1 or 2 carriers right now. They are having some very thorough studies made to find out why they have experienced engine problems. It's going right back to the fact that you are sitting on the runway for an hour with the engine idling. When you are getting into engines, it costs a thousand dollars at a clip to replace. This is big money. This has nothing to do with the traffic control system capacity. It's down at the airport.

Mr. MINSHALL. Off the record.

(Discussion off the record.)

Mr. BLATNIK. Captain, you say you have a picture to show in connection with your airport lighting problem.

Captain SMITH. Yes, sir. This is an 18-minute film; and if you would have the opportunity to view it, we can run it now. The reason I brought this in, this was a late development yesterday afternoon in answer to a call from Kansas City, wherein the airport operator out there wants to put 3,000 feet additional runway on his airport,

because evidently somebody told him that he needs it. He wants to properly equip this runway so as to permit a gradual move to the truly all-weather operation, and is experiencing difficulty in receiving airport aid because of the fact that he wants to do a good job on it and CAA believes he should do it some other way. This is an Air Force film.

(Whereupon the above-mentioned film was shown.)

Captain SMITH. Well, Mr. Blatnik, if I may just take up another moment and point out why we have brought this down here and why we have been taking a position and attempting outlining importance of the airport and why we go on to attempt to point out the important need of having some criteria. The centerline system referred to in here is an ALPA system that was worked out together with people from the carriers through the Air Transport Association and came into being 10 years ago. It took 10 frustrating years to get this thing adopted as a universal standard. Today it is a worldwide standard. As you can see, it is readily subscribed to by the military. It is subscribed to on international levels through IATA. Ten years after the thing was in operation at Newark Airport, and we were able to overcome all incidental delaying tactics you run into on a program of this nature, it was finally adopted as a standard. The ironic thing is that the standard that was adopted, with a few minor technical changes, was exactly the same thing that initially went into Newark.

Now we are getting into the era where we believe we can provide the traveling public with actually all-weather operations scheduling reliability and do it in a safe and orderly manner. This is what the people in Kansas City, for example, are interested in. I use Kansas City for example because it is the most recent one that came to mind late yesterday afternoon. The people out there want to put this system in with particular reference to the flush lighting. They are being refused the airport aid on the thing because somebody has decided that this won't do the job.

So once again we are getting into the area that, through one or two personal opinions, progress in aviation, or in this particular case getting into these high-cost aircraft, is going to be held back because somebody just won't accept what the users want. Everybody that is familiar with this system, that has to use it from a cockpit, for example, from the pilot's standpoint, or the airport owner who wants to install it, and the Bureau of Standards people, they have all evaluated it, have all come up with the same conclusion that they need it.

We have pretty much accepted the fact that on current runways this is a most expensive item to install. However, in areas where you are putting in new runways, the proportionate cost drops considerably because you don't have to dig up concrete and lay a lot of new electric lines and things of that nature.

So it appears that, even though we have the answer to gain the objective—bear in mind that the military is just as interested in the truly all-weather operation as we are, from the standpoint of performing their functions—the thing is going to be sidetracked again, unless somewhere along the line the philosophy that starts setting up specific requirements from an operation standpoint is brought to bear by someone. Currently it is CAA. We don't particularly enjoy coming down here and attempting to pinpoint errors or responsibility.

We are just trying to present in a constructive manner the problems we are running into. Conceivably the FAA, or whatever there comes out of all the deliberations today, will have the same basic responsibility. We are extremely fortunate in the fact that the man working with AMB on the visual aids is one of the fathers of the centerline system. We know what we need.

But through a little simple process of not permitting the Federal aid to go along with the proposal, which will eventually hit the airports in all the communities you people represent, we are not going to get the job done. It is for reasons along these lines and our bitter frustrating experience in years gone by—and it is pretty frustrating to find everybody agreeing with you 10 years after you come up with an answer—but these are the reasons we are placing so much emphasis on the airports. We don't particularly care to get involved with the reasons for the errors previously, but we think the time has come when it ought to stop.

And with that I would just like to point out our sincere appreciation for having an opportunity to take up so much of your time. I'm sure we have you very well behind schedule. I hope it has been helpful, and once again I point out it has been offered in a constructive manner.

Mr. BLATNIK. Captain Smith, I want to express the committee's appreciation for the time that you have obviously spent in preparation and in thinking out the very helpful statement and summation—not trying to lay the blame but very frankly and forthrightly pointing up any shortcomings, regardless of where the chips may fall. But our emphasis is on learning as much as possible of whatever shortcomings have occurred, so we can get underway and get an effective up-to-date system control in the management of our aircraft in this jet age which is now upon us. So I want to express my appreciation on behalf of the committee to you, Captain, and to your associates and colleagues and to the members of your organization.

Are there any other questions or statements?

Mr. MEADER. No.

Mr. MINSHALL. Off the record.

(Discussion off the record.)

Mr. PLAPINGER. May I ask just one question concerning the Kansas City situation.

You referred to somebody's refusing to grant the assistance or the necessary approval to install these lighting systems at Kansas City. Who was that somebody?

Captain SMITH. This is for the regional CAA people who are handling the airport problem; and it would be the third region, Kansas City region.

Mr. PLAPINGER. You mean this problem hasn't reached Washington? Do you know whether Washington has taken any stand?

Captain SMITH. Oh, yes; their people are operating under instructions. The point is that what they are forcing the community to do—and this is a similar problem; it's happening in Memphis; I've talked to the airport people down there on it—that when they come up with a program to try and properly equip an airport operationally, they have trouble having the thing accepted from an airport aid standpoint. For some reason, there seems to be a great desire to go into

these high-class terminal buildings and figure out who is going to build the biggest one.

Mr. MEADER. That is what bothered me a little bit about your statement. Both you and I have been complaining that the office of airports doesn't seem to be able to come up with any criteria or standard, and now you are complaining that they have a standard which excludes what the airport operator wants to do.

Captain SMITH. Not quite. What I am saying is that, because they have no standard, they can operate as a means of personal convenience.

Mr. MEADER. Oh, in other words, they do not disapprove this lighting system but they just do not want to spend Federal money for it. Is that it?

Captain SMITH. Oh, they disapprove it because they have one in operation down at Washington that they'd like to see as a substitute for it, and it won't do the job. Now, we don't want to see the money go into this type of project and be put in a position of having someone say, "Now, you've got an all-weather operation; go out and live up to it," when we can't.

Mr. MEADER. In other words, your complaint is, in this particular instance with respect to lighting, that the office of airports has established a standard but it isn't any good.

Captain SMITH. They have established a standard within their own organization that they use for a basis for refusing to apply Federal aid for something everybody feels is the answer.

Mr. PLAPINGER. What is the reason given for their refusal to grant airport aid to the Kansas City lighting system, do you know?

Captain SMITH. I don't know. I gather that it's because of the fact that somebody else thought about. [Laughter.] Seriously, this is the problem we had with the approach lights.

I merely brought this one out because, fortunately, I have this film here. This is an Air Force film. This has nothing to do with us or the airlines, except what they did was pick up the work that we have done and they have bought it. Some of the language there goes across pretty fast on the movie, but it is most potent. It points out these are the requirements we must have to do this type of job. These people flying the high-performance aircraft for a considerable period of time, let's say, could not use this system.

Mr. BLATNIK. Wha are the landing speeds, like an F–102, for instance?

Captain SMITH. Hazarding a guess, they took every airplane that the military, the Navy and Air Force, have, and some that the Army had, and exposed this system to their own pilots for a basis of reaching a conclusion. They ran anywhere from a speed over the runway from 90 knots up to 200 knots.

Mr. BLATNIK. Some of the approach rates are pretty fast.

Captain SMITH. Yes, sir. In the present day aircraft, you have approximately 12 seconds to run a quiz program when you see something, to decide when you are going to land. We say you don't have to get into a quiz-type, guess-type state; if we have the continuity of visual line aids, we can go right down the runway line.

Mr. MINSHALL. What are the minimums?

Captain SMITH. At Newark, 2,000 feet of visibility. In other words, when the weather is 2,000 feet visibility along the runway we

operate. Our biggest problem at Newark is getting to the terminal building after we get on the runway.

Mr. BLATNIK. If there are no other questions, again, thank you very much, Captain Smith.

Captain SMITH. Thank you, gentlemen.

Mr. BLATNIK. We will recess for lunch and the committee will resume hearings at 2:30 to hear Mr. Lawton.

Mr. Lawton, we appreciate your patience and hope you have enjoyed it, too. We appreciate your patience in waiting all morning and then waiting over to the afternoon to give your testimony.

Mr. LAWTON. I have waited on J. D. and his cohorts before, on the runways and traffic patterns; and this is nothing new.

(Whereupon, at 1:12 p. m., the subcommittee recessed, to reconvene at 2:30 p. m., the same day.)

AFTERNOON SESSION

Mr. MEADER (presiding). The meeting of the Subcommittee on Legal and Monetary Affairs of the House Committee on Government Operations will come to order.

We have Mr. William K. Lawton, executive director and secretary of the National Business Aircraft Association, Inc.

Mr. Lawton, will you proceed with your statement?

I understand that you have a prepared statement.

And in accordance with our custom, unless you have covered it in your statement, will you please give us a little of your biographical background?

STATEMENT OF WILLIAM K. LAWTON, EXECUTIVE DIRECTOR AND SECRETARY, NATIONAL BUSINESS AIRCRAFT ASSOCIATION, INC., WASHINGTON, D. C.; ACCOMPANIED BY RICHARD W. GROUX, ASSISTANT TO EXECUTIVE DIRECTOR AND SECRETARY, NATIONAL BUSINESS AIRCRAFT ASSOCIATION, INC., WASHINGTON, D. C.

Mr. LAWTON. Yes, sir.

I have been executive director of the National Business Aircraft Association since July 1956. My aviation background started in 1929, and I started flying in 1936.

At the present time I hold a commercial pilot's license with land and sea plane ratings. My military background in the Navy, starting in the Reserve as an enlisted man in 1933, at the Naval Air Station at Floyd Bennett Field.

I returned to the Navy on active duty as an ensign in 1941 in the Air Department, and was released from active duty in May of 1946 as a lieutenant commander.

I am still active in the Reserve.

I have had approximately 8 years' experience with air carriers as flight dispatcher in their operations department, and following that, for several years in commercial aviation, principally in the selling of aircraft to companies who own and operate their own aircraft for personal purposes.

With my aviation experience, also from 1933 to 1941 I worked as a newspaper reporter, primarily covering aviation activities.

Mr. MEADER. Perhaps you ought to cover just briefly your association. At least, I don't see it on the first page of your statement.

Mr. LAWTON. The National Business Aircraft Association is a nonprofit organization, incorporated under the laws of the State of New York originally as a corporation, as the Corporate Aircraft Owners Association. Its name was changed to the present one in 1948, and we came to Washington in 1950, and we have had our headquarters here ever since.

Our association's aim is to represent the companies, industries, persons, who own and operate their own aircraft as part of their company's business transportation.

We are active as members of the Air Coordinating Committee's various panels on air space.

Mr. MEADER. Before you go on to that, Mr. Lawton, you are concerned only with passenger aircraft, am I correct?

Mr. LAWTON. No, sir; our aircraft also carry cargo as needed—passenger and cargo or passenger alone.

Mr. MEADER. Are there any companies that have their own cargo airplanes to any great extent?

Mr. LAWTON. Not that are used exclusively for cargo, to my knowledge in our field. Of course, there are irregular scheduled carriers and irregular air carrier cargo outfits.

Mr. MEADER. But no company, as far as you know, has developed its own cargo——

Mr. LAWTON. No, sir; not exclusively designed for cargo airlift.

Mr. MEADER. Nothing like they have done in the field of trucking, for example?

Mr. LAWTON. No, sir.

Mr. MEADER. With their fleets of trucks.

Mr. LAWTON. No. There are several air carriers—one I am thinking of now operating principally out of Detroit, which is a major link for the large automobile manufacturers in carrying parts from their Detroit plants to their assembly plants, such as at Cleveland, Buffalo, Atlanta, Pittsburgh, but these are classed as irregular air carriers, not as business aircraft.

Mr. MEADER. I was trying to get whether or not your operations were primarily with aircraft used for executives, transportation of executives, or whether it also was interested in any cargo operations of companies which themselves, as distinct from these———

Mr. LAWTON. No, sir. The aircraft is used in combination. It is an ideal and universal tool. If they need people, they carry people; if they need parts, they carry parts.

Mr. MEADER. What I am trying to get at is, assume that General Motors or Chrysler developed a fleet of a half dozen flying boxcars, or some equivalent plane to carry freight for their own purposes, a private carrier, would they be a member of your association for that type of an operation?

Mr. LAWTON. I could conceive it, yes. Both the companies you mentioned are members of our association.

The opportunity to appear before this committee is greatly appreciated.

It comes at a crucial time, when the attention of Congress has been strongly focused on air safety problems.

Spurred by the recent tragic collisions between air carriers and military aircraft, goaded by the realization that we are 5 years behind in meeting the needs for air traffic control facilities and personnel, looking forward to the advent of the jet age, Congress has taken action to resolve certain aspects of this dilemma.

Creation of the Federal Aviation Agency is one step. The coordination of civil and military jet air traffic control is another step. Increased appropriations for the hardware and personnel to control air traffic adds another step.

All of these steps are needed.

But, in the smoke and fire of air safety headlines, in the resulting congressional actions taken or being taken, there has been 1 outstanding fact made clearly apparent to the aviation community which embraces 37,000 military aircraft, 80,000 private aircraft, and 1,800 air carrier aircraft.

Mr. MEADER. Incidentally, I don't think you mentioned the number of aircraft owned by the members of your association and those in the same class.

Mr. LAWTON. As our association or in business flying generally?

Mr. MEADER. Why not both?

Mr. LAWTON. The Department of Commerce-CAA estimates there are approximately 30,000 aircraft used wholly or in part for business purposes. We represent the companies who operate the largest of these fleets and our aircraft in our membership totals nearly 2,000.

The fact—and it is one of outstanding significance—is that the solutions offered to resolve our aviation problems have been in relation only to those problems concerning the military aircraft and those of the air carriers. Little has been said, less has been done to recognize the complete aviation community picture. This picture comprises more than just the 1,800 air carriers, more than the high-speed military jet aircraft, more than the handful of commercial jet airliners coming into existence. It includes 30,000 aircraft used by businesses, large and small, for their transportation needs; it includes more than 4,500 aircraft used in aerial application; it includes more than 2,000 aircraft used for pipeline patrol and aerial survey work; it includes more than 5,000 aircraft used for training and instruction. It includes more than 2,000 aircraft used by the irregular air carriers, and air-taxi operations. It includes about 35,000 aircraft used for personal transportation—the so-called pleasure flying.

These aircraft—of the general aviation fleet—are of all types and capabilities; four-engined, pressurized transports; heavy twin-engined DC–3's and Lodestars; light twin-engined Aero Commanders; Beechcraft, Pipers; single-engined Cessnas, Navions, helicopters; and we now have several jet aircraft and turboprop aircraft either on the market or shortly to become available to the general aviation fleet.

As a matter of record, the first civil jet aircraft to be certificated by the CAA was designed exclusively for the general aviation market. I refer to the Beechcraft Morane-Saulnier which was awarded its type certificate just recently. Other jets which will be available to the general aviation market are the Lockheed Jetstar, the McDonnel 119, and the North American Sabreliner. Turboprops are

now in use. The Viscount is in use today by several American business organizations. The Fairchild 27 is on order by more than 20 American business firms. The Grumman Gulfstream also has been ordered by nearly 30 American business companies.

I have cited these aircraft by types and numbers in order to present a brief picture of the composition of the American general aviation fleet.

This fleet has proven itself to be essential to the American economy. Each year more and more American businesses engaged in many varied types of commerce have found that the use of aircraft in business has proven a great asset. Now this fleet numbers more than 30,000 aircraft with about 10,000 companies owning and operating them.

This general aviation fleet is faced with a grave problem that has been only lightly touched upon by either the House or the Senate. I refer to the lamentable and deplorable state of aviation weather services rendered by the United States Weather Bureau to this vast fleet of aircraft.

What is even more incomprehensible to the general aviation community is the disregard shown by Congress, the Bureau of the Budget, by the Department of Commerce and within the Weather Bureau itself to the basic safety problems raised by the degradation of Weather Bureau aviation service.

The record is clear and unmistakable.

I refer to the testimony presented before the House Subcommittee on Appropriations by the Weather Bureau on June 26 and July 1 of this year. This testimony was presented in connection with the supplemental appropriations bill and is so recorded in the record of the hearings.

Here we can see, on the record, the Weather Bureau's statement of needs which were approved by Commerce Department and deleted by the Bureau of the Budget. I refer to the Document No. 2 which appears on page 584 of the hearings record.

Each one of these items was considered as a necessary item by the Weather Bureau. They were approved by the Commerce Department. They were cut by the Budget Bureau.

Of the 8 items submitted, 6 are desperately needed by the general aviation fleet. Of the 8 items submitted, only 1 was recommended for approval by the House subcommittee. That particular item was for the sole benefit of the air carriers who someday in the future will be engaged in international travel with jet aircraft. The fact that the United States is a party to an ICAO agreement which calls for the provision of this service was mentioned as a reason for the inclusion of this one item in the committee's recommendations. The fact that other nations, signatories to this agreement, have failed to provide this service was not explored.

Nevertheless, this 1 item of 8 was recommended.

Also recommended in the supplemental hearing was $1,300,000 for hurricane research which called for the outfitting of 3 aircraft with complex electronic gear, the personnel to operate the equipment, and for contracts for data reduction to 2 universities.

Also recommended in the supplemental hearing were funds for 15 long-range radars for weather-warning services.

The two latter items have some benefit and bearing on the needs of general aviation for weather information. Let's look at what was asked for by the Weather Bureau as recorded in this Document No. 2.

1. High-altitude forecasts for international flights.
2. Continuous weather-warning broadcasts for pilots.
3. Restoration of aviation forecast briefing services at 72 active airport weather stations.
4. Provision of 24-hour-a-day aviation weather observations at 26 high-activity airports.
5. Automatic aviation telephone forecasts at 50 high aviation activity airports.
6. Establishment of new aviation weather reporting stations at 36 airports which meet existing criteria.
7. Facsimile weather map installations for 55 Weather Bureau airport stations which have at least 24,000 aircraft operations per year; and installation of tel-autograph weather-reporting equipment.
8. Completion of upper air observation network for the Continental United States.

Item No. 1—high altitude forecast for international flights—has been mentioned as being for the sole benefit of the commercial air carriers both foreign and domestic. There is no mention made of any military necessity for these observations. The military has, at present, a meteorological organization which far surpasses in size and appropriations anything that the United States Weather Bureau has to offer or be offered. There is no direct benefit to the general aviation fleet of 80,000 aircraft. There is direct benefit only to the air carriers, domestic and foreign, operating a handful of jets across the international routes.

Mr. MEADER. That is the item that was allowed?

Mr. LAWTON. That is the item that was allowed; yes.

Item 2—continuous weather warning broadcasts to pilots. The Weather Bureau, in Document No. 2, describes this as follows:

> This program will provide for continuous radio broadcasts to pilots of existing weather conditions plus information as to hazardous weather conditions which are expected to develop during the ensuing 6 to 12 hours. The 88 CAA low/medium frequency ranges will be utilized to transmit the weather information. In this way pilots will be able to obtain the required weather-briefing service without recourse to crowded telephone channels.
>
> Weather Bureau requirements consist of 3 forecasters at each of the 25 flight advisory weather service centers; 4 forecasters and 16 technical assistants at the National Severe Weather Forecasting Center at Kansas City; and 1 employee for each of the 87 low/medium frequency range broadcasting stations, yet to be implemented, plus 10 employees for supporting services.
>
> Some additional communications links are needed to carry the text of the broadcast from the Weather Bureau to the CAA communication station.

That is the end of the Weather Bureau's quotation.

The Weather Bureau described their financial requirements for fiscal year 1959 for this program as follows: Personal services: 192 positions, 59.4 man-years, $394,400; other objects, $252,600; with a total of $647,000 for the program.

It is necessary at this point to examine how the general aviation fleet is dependent on aviation weather services and to compare their needs with those of the military and the air carriers.

Let us examine the air carriers. Basically they have two modes of providing weather information to their pilots. The first mode is typi-

cal of the larger air carriers who provide a complete forecasting service to their pilots through their own meteorologists. These airline meteorologists receive the basic data from weather teletype information, from facsimile maps transmitted by the Weather Bureau, and from reports made by their pilots. This data is reduced and applied to the routes over which that air carrier flies. Detailed cross sections of the weather along their routes are drawn, detailed analysis of the terminal airport weather is made for each airport the airline serves, recommendations are made to the pilots and to the flight dispatchers as to the preferential route of flight.

The second mode, followed by other air carriers is to have the Weather Bureau's data analyzed by the flight dispatcher, who is certificated by Government examination, and whose profession includes more than just a basic knowledge of meteorology. The flight dispatcher makes his recommendations to the pilot.

In both methods the pilot receives a briefing by qualified weather analysts and, of course, makes his own analysis to form his final decision as to the route of flight and the altitudes at which it would be best to conduct the flight.

Once in flight, all air carriers are in radio contact of their own air carrier-operated radio stations. Any change in the weather, for better or worse, whether en route or at destination is relayed to the pilot by the flight dispatcher.

This ability to provide constant weather information to the air-carrier pilot from qualified ground personnel is one of the basic reasons for the tremendous safety record and for the highly satisfactory reliability record of the air carriers.

General aviation does not have this vast ground support. We do not have our own weather forecasters, we do not have constant weather-analysis information, we do not have our own radio-communications network to carry this information to us.

We are solely dependent upon the United States Weather Bureau for this information and upon the CAA's radio stations to broadcast this information.

The types of general aviation pilots vary from the student pilot with a few hours' experience through the broad categories of private pilots, industrial pilots to the highly skilled, professional corporation pilot who maintains the same type of airman certificate as does the air-carrier pilot.

How do these pilots get their weather information?

If they are near an airport which has a forecaster they usually visit him for a personal briefing. These briefings, interrupted by telephone calls from newspapers, pilots, TV stations and housewives, harassed by strict time schedules for other office duties, are done willingly and competently by the forecaster. With this information the pilot departs. From that moment on the general aviation pilot—once airborne—has extremely limited facilities from which to obtain weather information. If he is flying on or adjacent to civil airways he may obtain the hourly weather reports if he requests them from the nearest CAA radio station. With the presently overcrowded radio channels these requests place an even greater burden on the CAA radio operator who is also responsible for receiving traffic-control-position reports of aircraft; relaying them to the air-traffic-control

centers and for relaying traffic instructions back to the aircraft in his area.

The solution to this problem is outlined in the request made by the Weather Bureau. By placing this vitally needed weather information in broadcast form over existing CAA radio range facilities the general aviation pilot can at all times determine the current status of the weather ahead and receive the latest forecasts for his route of flight. Severe weather conditions of violent thunderstorm areas, tornado areas, of heavy ice or snow either on the airport or at flight altitude will be immediately available to these pilots. They will, as a result, be able to make basic flight safety decisions with the basic weather knowledge at their immediate disposal.

This is aviation safety applied at the grassroots. It is supplied to every type of aircraft, to every type of pilot. It is done without complex black boxes on the aircraft. It is done with a minimum expenditure of money. It provides not only safety in flight, it also could provide every person in the United States who has a desire to know what weather conditions are and will be in his area with a low-cost, continuous weather broadcast. This information can be used by farmers, motorists, boatmen, housewives, sportsmen of all types. The list could go on for many more hundreds of occupations and industries.

Document No. 2 presented by the Weather Bureau at the request of the House Appropriations Subcommittee has listed as its third item "Restoration of aviation forecast briefing services."

In the Weather Bureau's explanation of the reasons for this request it states:

> During the past year services to aviation have been curtailed at 72 active airport weather stations due to dropping of positions and holding other positions vacant. In order to meet minimum aviation weather services needs restoration of personnel at the following locations is essential. * * *

There follows the listing of the 72 cities at which aviation weather services have been curtailed.

The budget requirements of this Weather Bureau program for fiscal year 1959 is as follows: Personal services (77 positions, 46.2 man-years), $291,800; other objects, $92,400; for a total of $384,200.

It should be pointed out at this juncture that in 1947 there were approximately 1,500 Weather Bureau employees concerned with forecasting and briefing. Due to budget curtailments and due to shifting of personnel to research work, this number now totals 1,100 employees.

These 1,100 employees are handling 3 times as many aircraft operations as the 1,500 did 11 years ago.

This is not just a paradoxical situation. It is one fraught with ugly, brutal airplane accidents and deaths.

The accident record for the years 1955 and 1956 prove this point. In that 2-year period the Civil Aeronautics Administration cites weather as a causal factor in 37 air-carrier accidents.

Mr. PLAPINGER. May I ask a question at that point?

Mr. LAWTON. Yes.

Mr. PLAPINGER. When you say it cites weather, does that mean there was a lack of weather information available?

Mr. LAWTON. No, it cites weather as being a cause in the accident.

Mr. PLAPINGER. Is there any indication in these reports that there was an unavailability of weather information?

Mr. LAWTON. No, it does not so indicate.

For general aviation the figure is an appalling 1,931 accidents.

In the past 11 years the Weather Bureau has dropped 22 percent of its stations. About 25 percent of the remaining 200 airport stations are closed part of the day.

Why has this been done? Let us examine the testimony given by Dr. Reichelderfer, Chief of the United States Weather Bureau before the House Subcommittee on Appropriations. I refer to page 559 of the hearings record concerning the supplemental budget requests.

Dr. REICHELDERFER. The decrease in stations and the decrease in number of personnel has come about during the last year or two primarily because the items that we were under obligation to carry out have taken a large proportion of our appropriation and since we did not have enough money to cover the obligations, the research and storm warning service, about which I will give details in a moment, plus the basic network of stations, the only place that we could keep within the budget, the appropriations, was to cut stations.

Despite the doctor's testimony, the money for restoring—not increasing—restoring—these curtailed services was not acted upon by the House subcommittee.

Item No. 4, as submitted by the Weather Bureau in their Document No. 2 was to—

provide 24-hour-a-day aviation weather observations at high activity airports.

The Weather Bureau outlines this need as follows:

At 57 locations in the United States the Weather Bureau airport station is now operated on a part-time basis (less than 24 hours a day). Lack of weather reports during the hours the station is closed and the unavailability of aviation weather briefing services poses a severe handicap to pilots and to other users of weather services such as farmers, businessmen, etc.

To permit extension of operation to the full 24-hour period at the 26 highest priority domestic locations, additional staff requirements are * * *

There follows the detailed listing of the stations which require 24-hour service and do not have it.

The financial requirements for this program for fiscal year 1959 are: Personal services (71 positions, 42.6 man-years), $269,000.

It should be noted here that many of these stations were taken over by the Weather Bureau from the CAA. These stations were manned by the CAA on a full-time basis, yet when the Weather Bureau took these stations over, they could not maintain them on a 24-hour basis; when funds were requested to restore the services to their original status, the Bureau of the Budget knocked them out. When brought to the attention of Congress, they were ignored.

Again the request was to restore, not to increase.

Item No. 5 in the Weather Bureau's Document No. 2 was for installation of automatic telephone forecasts. This item has some merit, in our estimation, to reduce the amount of man-hours spent on telephone answering service. It is ideally adapted to local weather information. Its value to the cross-country pilot is small. We believe that the provision of the 88 low/medium frequency radio broadcast stations will provide the service in greater detail than will the automatic telephone forecasts. This Weather Bureau item is one that, if all other basic services were being fully provided, would be thoroughly justified.

Item No. 6 in the Weather Bureau's Document No. 2 was a listing of 36 airports meeting the criteria for establishment of new aviation weather reporting stations.

It is at these airports where the great amount of business flying is being conducted. At many of these airports there is also air-carrier service. It is to these airports that general aviation is being encouraged to fly in order to relieve congestion at the densely populated major air-carrier terminals. General aviation is being encouraged to go there. we are willing to use these airports, we do use these airports; but we use them only on a limited basis because we are not assured of complete and hourly weather reports from these stations.

At some of these 36 airports weather information is supplied to the Weather Bureau through the cooperation of the air carriers. This is not a 24-hour service, nor is the weather being observed by Weather Bureau personnel. The budget requirements for these stations are estimated to be at $60,000 per station per year.

Item No. 7 requested by the Weather Bureau, deleted by the Budget Bureau, presented in Document No. 2 to the House subcommittee and ignored by them was for the installation of weather map facsimile machines at Weather Bureau airport stations having at least 24,000 aircraft operations per year.

Fifty-five sites are listed. The Weather Bureau comments state:

> A basic requirement at any Weather Bureau airport station engaged in furnishing pilots with weather information is current maps of existing weather conditions at the surface and extending up to levels of 20,000 feet and higher. In order to provide such maps without the need for laborious hand plotting and duplication of analysis work, the national weather facsimile network has been established. The fundamental maps are plotted once and analyzed by highly skilled meteorologists at the National Meteorological Center at Suitland, Md. Each map is then transmitted by facsimile to all weather stations on the national facsimile network.
>
> The following Weather Bureau stations which now lack this important facility and thus have inadequate weather maps available for aviation weather briefing and forecasting services, should be provided with connections to the national circuit.

The Weather Bureau estimates the budget requirements for this service for fiscal 1959 to be $285,300.

The eighth item, completing upper air observing network for continental United States, is listed by the Weather Bureau to bring to full strength their upper air sounding requirements. While this has some value to general aviation, it is felt that stronger consideration should be given to the items mentioned previously.

As a nation we are spending immense sums of money to develop a system of airways, a system of airway traffic control, and a complete radar network to control traffic, all in the name of flying safety. Yet we have ignored one of the basic causes of air accidents—those caused by weather.

It is to this basic flaw that I am addressing my remarks. It is done so in the hopes that some Members of Congress will be profoundly and sincerely affected by this tragic degradation of aviation weather services. It is done in hopes that Congress will demand that adequate funds are provided the Weather Bureau.

This citing of the record is done in hopes that action will be taken to prevent the needless loss of lives which are directly attributable to lack of aviation weather services.

In closing may I quote a paragraph written by Arthur E. Abney, director of the State of Illinois Department of Aeronautics in the May-June issue of their State aviation publication.

> One of the largest factors in fatal aviation accidents, as any aviation safety official will readily admit, is weather-induced accidents. For years aviation safety people have been preaching "avoid bad weather," "stay out of bad weather," etc. Our present inability to adequately brief pilots in regard to weather conditions expected en route will do much in the future to negate a tremendous amount of progress made by aviation safety officials at all levels of government and industry. In the final analysis, it is the safety factor which makes the improvement of aviation weather service such a vital factor and of concern to everyone interested in air commerce. Whether that individual be a pilot or a passenger on an air carrier, or a general aviation pilot or businessman who flies in furtherance of his own enterprise, or a military pilot training for an actual mission in the defense of his country, there can be no "luxury" where the saving of lives is concerned.

With these remarks all in general aviation heartily concur.

It is sincerely hoped that Congress will take the second step forward in aviation safety, that of bringing the United States Weather Bureau's aviation weather services into phase with present aviation requirements.

Congress has examined the problems of the air carriers. They have examined the problems of the military air services. Congress has taken positive action to provide a better system of air traffic control and a better system of administrating that control.

Now, we ask, let Congress take positive action for the 88,000 aircraft in the general aviation fleet whose air traffic control problems and whose safety problems are compounded by lack of weather information.

Mr. MEADER. Mr. Plapinger.

Mr. PLAPINGER. Mr. Lawton, going back to this question again that I raised before, you say on page 12:

> This citing of the record is done in hopes that action will be taken to prevent the needless loss of lives which are directly attributable to lack of aviation weather services.

Can you point to any instance in which there has been an accident in which the lack of aviation weather services was cited?

Mr. LAWTON. I can recall—and this is from memory—one of the recent accidents, about which it is hard to trace the history of the pilot prior to taking the flight. I refer now to the very serious accident we had at Culpeper, Va., in which four residents, I believe, of Albany, Ga., lost their lives.

This flight departed from Friendship Airport at Baltimore on a VFR flight pattern. It is understood that the pilot availed himself of the self-briefing service. That is, he went up to the Weather Bureau. Presumably the forecaster was busy with the phones or other duties. He read the weather map and looked at the sequences, and departed.

He filed a VFR flight plan, despite the fact that there were a number of thunderstorms in the immediate area.

He flew 2 hours and covered a distance that normally would take 25 minutes. At that point he contacted the CAA and requested an

IFR flight pattern. He was given it and a few minutes later he crashed, and four persons were killed.

We can only presume from the evidence that we know now of what transpired. However, wo do say this with certainty, that if that pilot had talked to the forecaster and gotten the information that an air carrier pilot would have gotten from his forecaster, the man would have done one of two things. He would have filed an IFR flight plan immediately, or secondly, he would have canceled his flight.

Several days previous to that we had an Army plane——

Mr. PLAPINGER. When did this Culpeper accident occur?

Mr. LAWTON. This was about 2 weeks ago.

A few days before the Culpeper accident, the Army lost a twin-engine plane here in Maryland on a flight to pick up passengers, again as a result of thunderstorm activity.

We don't know what briefing the pilot got.

Mr. PLAPINGER. You say the Army or the military have a more extensive meteorological service than the Weather Bureau.

Mr. LAWTON. We don't know what information he got. Unfortunately, and we have called this to the attention of the Weather Bureau, they do not keep a record of who calls and asks them for weather information for a flight plan. We urged them to do so either by recording it mechanically or otherwise.

Under present circumstances, unless the pilot was at the place and the forecaster remembered him, there is no definite linkage as to what information he had or was given prior to his departure on flight.

But we do know there are an awful lot of people who are flying along now and do not have access to this weather and this information even after they have departed.

Further, the availability of forecasters is not widespread. You don't have them at all airports. There are 200 airports at which you have weather forecasting services. There are 6,000 airports around the country.

And the only way the pilots at these airports can get any weather information under the present circumstances is by a long-distance call.

Mr. PLAPINGER. Would you advocate that weather forecasters be placed at 2,000 airports?

Mr. LAWTON. No, sir. This can be done, as we have pointed out in our testimony here, by putting this weather information on these 88 broadcasting stations which are now in existence, and which for a small sum can do the job. Everybody in the country can have the information.

Mr. MEADER. Well, Mr. Lawton, these 8 items that you complain of as being deleted—no, one was granted; is that right?

Mr. LAWTON. That is correct, sir.

Mr. MEADER. Seven were deleted.

Mr. LAWTON. That is correct.

Mr. MEADER. They were all deleted by the Bureau of the Budget, were they?

Mr. LAWTON. Yes, they were deleted by the Bureau of the Budget

We caused the situation where this information was made available to the House Subcommittee on Appropriations and was read in the record in their supplemental hearings in an effort to show how the

Budget Bureau, for one, had been curtailing the service without the knowledge of Congress, giving them a chance to act upon them, and despite the fact that this information, through this method, was presented to the Subcommittee on Appropriations, it was ignored.

Mr. MEADER. At any rate, the Appropriations Committee did not do any further cutting.

It was done by the Budget Bureau.

All you are complaining about the committee is that they did not restore it over the recommendation of the Budget Bureau.

Mr. LAWTON. That is correct.

Mr. PLAPINGER. Was this heard in the original appropriations hearings?

Mr. LAWTON. No, sir, it was not.

In the original appropriations it was not brought to light.

We do not have access to the interdepartmental workings of what the Weather Bureau submits to Congress and the Budget Bureau submits to the Congress. All we see is what is brought to the House. When we saw this glaring deficit, then we went into action.

Mr. MEADER. I rather gathered that these items were to pay for the cost of services which the Weather Bureau had been rendering that were being discontinued; is that correct?

Mr. LAWTON. They have been discontinued over the years, yes, sir. The majority of these items here are to restore to original substance the service that was being rendered, which had been cut.

Mr. MEADER. How did they happen to come into a supplemental hearing? I don't quite get that.

Mr. LAWTON. The deficiency items were called to the attention of the House subcommittee through our efforts. We had considerable correspondence with these people in an effort to bring this information to light.

Mr. MEADER. Deficiencies in supplemental appropriations are usually where the department has run out of money in performing some service, where they need a little more money to finish out the year, on programs that were approved in their original appropriations bill.

Mr. LAWTON. The three items that the House subcommittee acted upon in the supplemental hearing were not introduced in the original appropriations request. This was a supplemental request.

Mr. MEADER. Well, of course, our committee is not set up to review the decisions made by the Appropriations Committe of Congress so much as it is—well, it isn't set up to do that at all. Our committee is supposed to look into the efficiency of the expenditures that were actually made by the departments and approved by Congress.

Your entire statement seems to be aimed solely at the decisions made by the Budget Bureau and apparently agreed to by the Appropriations Committee in the supplemental appropriation.

Don't you have any other criticisms of the handling of aviation matters on other phases of the responsibilities of the CAA, which might have some effect upon the operations of your membership?

Mr. LAWTON. We have reviewed the testimony given by the other witnesses and are in great accord with the majority of the remarks. We were particularly interest in Captain Smiths remarks.

But with the exception of one other witness, all this committee has heard about is what the airlines need. They are but one segment. They are an important segment. We don't decry their importance to the economy of the country, but my understanding is that we are concerned with the Federal role in aviation, and the Weather Bureau is certainly part of the role of the Federal Government in aviation.

No one has commented upon this serious deficiency and it is a most critical one, and because of it——

Mr. MEADER. I would take it from the fact that you devoted your entire statement to that subject so far as your organization is concerned, that is the most serious, most important deficiency.

Mr. LAWTON. Yes, it is.

It vitally affects every movement we take. We don't have the ground support that your air carriers and military, the other two segments of aviation, have, and at the same time the pilots of the military and the air carriers are the most professional and the most experienced compared to the broad gage of the pilots that we have in the general aviation fleet.

And here everything that has gone on before in various accident investigations is cause for concern with air carriers and their relationship with the military.

Mr. MEADER. Mr. Lawton, I want to say that we appreciate your contribution in bringing this matter to the committee's attention. We appreciate your taking the time to come and present your statement.

And also I want to express our appreciation for your indulgence in the delay before we got your statement presented.

Mr. LAWTON. This is one item that I hope I have stirred some interest in, at least to one distinguished Member of Congress in hopes that he will follow through. We are losing too many people due to accidents in weather. The focusing of Congress and the public gets one sided into the military aircraft-air carrier complex. They don't realize there are 88,000 other aircraft with them subject to midair collisions and air-traffic-control problems.

The whole emphasis now is on how are we going to take care of the air carriers and the military.

It is like examining the problems of the Greyhound bus lines and ignoring everybody else on the highways.

Mr. MEADER. We are glad to have your statement.

Mr. PLAPINGER. Mr. Chairman, in accordance with our usual custom in the past, we request authority to make appropriate insertions in the record.

Mr. MEADER. So long as they are appropriate.

Without objection, counsel may incorporate such appropriate insertions into the committee's record.

Mr. LAWTON. Thank you very much.

Mr. MEADER. The hearings are concluded.

(Whereupon, at 3:45 p. m., the committee adjourned, subject to the call of the chairman.)

APPENDIX

EXHIBIT 1

MIDAIR COLLISIONS IN UNITED STATES CIVIL FLYING, (CALENDAR YEARS 1948–57)

Bureau of Safety, Analysis Division, Civil Aeronautics Board, Washington, D. C., May 19, 1958

ANNUAL TOTALS

In the 10-year period, 1948–57, a total of 159 midair collisions were recorded in United States civil aviation, as follows:

Calendar year	Injury index		Total
	Fatal	Nonfatal	
1948	15	15	30
1949	11	6	7
1950	3	4	7
1951	7	6	13
1952	6	8	14
1953	0	9	9
1954	10	6	16
1955	8	13	21
1956	11	6	17
1957	6	9	15
Total	77	82	159

OPERATIONS IN WHICH MIDAIR COLLISIONS OCCURRED

The 159 midair collisions involved collisions between 2 air-carrier aircraft, air-carrier and general-aviation aircraft, air-carrier and military aircraft, 2 general-aviation aircraft, and general aviation and military aircraft, as follows:

Air carrier and air carrier (2 fatal) [1]	3
Air carrier and general aviation (8 fatal)	12
Air carrier and military (2 fatal)	3
General aviation and general aviation (57 fatal)	119
General aviation and military (7 fatal)	21
Test flight [2] (fatal)	1
Total (77 fatal)	159

[1] 1 of these fatal accidents involved midair collision between 2 irregular air carriers making simulated (hooded) instrument approaches as part of a 6-month pilot-competency check; the 2d 1 was the midair collision at Grand Canyon, Ariz., on June 30, 1956.

[2] This fatal accident involved a midair collision between a DC–6B and an Air Force F–89–J during the course of a factory-conducted test flight; hence, neither airline nor Air Force operation was involved.

MIDAIR COLLISIONS INVOLVING SCHEDULED PASSENGER OPERATIONS

The first of the 2 midair collisions to date between 2 airliners operating in scheduled passenger services was recorded on August 26, 1953, at Michigan City, Ind. There were no fatalities and the airliners were able to effect a safe landing. The second one in these services occurred at Grand Canyon, Ariz..

on June 30, 1956, and all occupants in both aircraft (128 passengers and crew) perished.

FATALITIES IN MIDAIR COLLISIONS

A total of 402 persons perished in the 159 midair collisions recorded during 1948–57. The highest number (128) occurred in the Grand Canyon collision, next in importance from this standpoint having been the DC–4 and Bolivian piloted P–38 collision at Washington National Airport on November 1, 1949, in which 55 persons were killed.

FACTORS INVOLVED

In order of numerical importance, the 159 midair collisions occurred in the following operational phases: landing approach, traffic pattern, normal flight, and takeoff climb. Others occurred during the course of buzzing, acrobatics, and racing.

Clear weather prevailed in 149 (94 percent) of the midair collisions. Visibility was in excess of 3 miles in 155 (98 percent) of the 159 occurrences, of which 150 (94 percent) occurred during daylight, 5 at night, and 4 during twilight.

ALTITUDE AND AIRPORT PROXIMITY

The altitudes at which midair collisions occurred ranged primarily from 10 to 4,000 feet, 4 others having occurred at 9,500, 10,700, 21,000, and 25,000 feet.

With respect to airport proximity, the collisions occurred as follows:

	Number	Percent		Number	Percent
On airport	41	26	Within 3 miles	7	4
Within ¼ mile	23	15	Within 4 miles	6	4
Beyond 5 miles	22	14	Within ¾ mile	5	3
Within 2 miles	20	13	Not reported	5	3
Within ½ mile	11	7			
Within 5 miles	10	6	Total	159	100
Within 1 mile	9	5			

ATTACHMENTS

Table No. 1: Midair collisions, by classes of operation (1948–57).

Table No. 2: Midair collisions in relation to airport proximity and altitude (1948–57).

Table No. 3: Altitudes of midair collisions in civil flying and midair collisions in relation to airport proximity (1948–57).

Table No. 4: Summary of midair collisions by altitudes and distances from airport (1948–57).

Table No. 5: Altitudes and operational phases in midair collisions and airport proximities and operational phases (1948–57).

Résumé of midair collisions in United States civil flying (exclusive of aerial crop control operations) (January 1, 1948, to December 31, 1957).

TABLE No. 1.—*Midair collisions by classes of operation (1948–57)*

Operation	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	Total
General aviation and general aviation:											
Fatal	14	7	3	4	2	0	8	6	9	4	57
Nonfatal	13	4	4	3	6	6	6	10	5	5	62
Total	27	11	7	7	8	6	14	16	14	9	119
General aviation and military:											
Fatal	1	0	0	1	2	0	1	0	1	2	8
Nonfatal	2	2	0	2	1	2	0	2	0	3	14
Total	3	2	0	3	3	2	1	2	1	5	22
General aviation and air carrier:											
Fatal	0	3	0	1	2	0	0	2	0	0	8
Nonfatal	0	0	0	1	1	0	0	1	1	0	4
Total	0	3	0	2	3	0	0	3	1	0	12
Air carrier and military:											
Fatal	0	1	0	0	0	0	1	0	0	0	2
Nonfatal	0	0	0	0	0	0	0	0	0	1	1
Total	0	1	0	0	0	0	1	0	0	1	3
Air carrier and air carrier:											
Fatal	0	0	0	1	0	0	0	0	1	0	2
Nonfatal	0	0	0	0	0	1	0	0	0	0	1
Total	0	0	0	1	0	1	0	0	1	0	3
Total:											
Fatal	15	11	3	7	6	0	10	8	11	6	77
Nonfatal	15	6	4	6	8	9	6	13	6	9	82
Grand total	30	17	7	13	14	9	16	21	17	15	159

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TABLE No. 2.—*Midair collisions in relation to airport proximity and altitude (1948–57)*

Altitudes (feet)	On airport	Within (miles) from airport								Beyond 5	Unknown	Total
		¼	½	¾	1	2	3	4	5			
General aviation and general aviation:												
6 to 10	10	0	0	0	0	0	0	0	0	0	0	10
11 to 25	5	0	0	0	0	0	0	0	0	0	0	5
26 to 35	6	1	0	0	0	0	0	0	0	0	0	7
51 to 60	3	1	0	1	0	0	0	0	0	0	1	6
76 to 100	4	3	0	0	0	0	0	0	0	0	0	7
101 to 125	0	1	0	0	0	0	0	0	0	0	0	1
126 to 150	4	0	1	0	0	0	0	0	0	0	0	5
176 to 200	1	7	2	0	0	0	0	0	0	0	0	10
351 to 400	1	0	1	1	1	1	1	0	0	0	0	6
451 to 500	0	0	1	0	0	1	0	0	0	0	0	2
501 to 550	0	0	0	0	2	1	0	1	1	1	0	6
601 to 650	0	3	1	0	0	0	0	0	0	0	0	4
701 to 750	0	2	0	0	0	1	0	0	0	0	0	3
751 to 800	0	1	0	0	0	0	0	0	0	1	0	2
801 to 850	0	0	0	1	0	0	0	0	0	0	0	1
851 to 1,000	0	0	2	0	0	3	0	0	0	0	1	6
1,001 to 1,500	0	1	0	0	1	1	0	2	3	5	0	13
1,501 to 1,800	0	0	0	0	0	1	0	0	1	0	0	2
2,001 to 2,500	0	0	0	0	1	2	1	0	0	4	2	10
2,601 to 3,000	0	0	0	0	1	1	2	0	0	0	0	4
Over 3,000	0	0	0	0	0	1	0	0	1	1	0	3
Unknown	1	1	0	0	0	1	0	0	3	0	0	6
Total	35	21	8	3	6	14	4	3	9	12	4	119
General aviation and military:												
6 to 10	1	0	0	0	0	0	0	0	0	0	0	1
201 to 250	1	0	0	0	0	0	0	0	0	0	0	1
701 to 750	0	0	0	0	0	1	0	0	0	0	0	1
801 to 850	0	0	1	0	0	0	0	0	0	0	0	1
1,001 to 1,500	0	0	0	0	1	0	0	2	0	1	1	5
1,601 to 1,800	0	0	0	0	0	0	1	0	0	0	0	1
2,001 to 2,500	0	0	0	0	1	1	0	0	1	1	0	4
2,601 to 3,000	0	0	0	0	0	2	1	0	0	0	0	3
Over 3,000	0	0	0	0	0	0	0	1	0	3	0	4
Unknown	0	0	1	0	0	0	0	0	0	0	0	1
Total	2	0	2	0	2	4	2	3	1	5	1	22
Air carrier and air carrier:												
2,601 to 3,000	0	1	0	0	0	0	0	0	0	0	0	1
Over 3,000	0	0	0	0	0	0	0	0	0	2	0	2
Total	0	1	0	0	0	0	0	0	0	2	0	3
General aviation and air carrier:												
6 to 10	1	0	0	0	0	0	0	0	0	0	0	1
26 to 35	1	1	0	0	0	0	0	0	0	0	0	2
301 to 350	0	0	1	0	0	0	0	0	0	0	0	1
351 to 400	0	0	0	0	1	0	0	0	0	0	0	1
701 to 750	0	0	0	1	0	0	0	0	0	0	1	1
801 to 850	0	0	0	0	0	0	1	0	0	0	0	1
1,001 to 1,500	1	0	0	0	0	1	0	0	0	0	0	2
1,501 to 2,000	0	0	0	0	0	1	0	0	0	0	0	1
2,001 to 2,500	0	0	0	0	0	0	0	0	0	1	0	1
Over 3,000	0	0	0	0	0	0	0	0	0	1	0	1
Total	3	1	1	1	1	2	1	0	0	2	0	12
Air carrier and military:												
200 to 250	1	0	0	0	0	0	0	0	0	0	0	1
301 to 350	0	0	0	1	0	0	0	0	0	0	0	1
2,001 to 2,500	0	0	0	0	0	0	0	0	0	1	0	1
Total	1	0	0	1	0	0	0	0	0	1	0	3
Grand total	41	23	11	5	9	20	7	6	10	22	5	159

TABLE No. 3.—*Altitudes of midair collisions in civil flying (1984–57)*

Altitudes (feet)	Collision between							Total
	Air carrier to air carrier	Air carrier to general aviation	Air carrier to military	Subtotal	General aviation to general aviation	General aviation to military	Subtotal	
6 to 10	0	1	0	1	10	1	11	12
11 to 25	0	0	0	0	5	0	5	5
26 to 35	0	2	0	2	7	0	7	9
51 to 60	0	0	0	0	6	0	6	6
76 to 100	0	0	0	0	7	0	7	7
101 to 125	0	0	0	0	1	0	1	1
126 to 150	0	0	0	0	5	0	5	5
176 to 200	0	0	0	0	10	0	10	10
201 to 250	0	0	1	1	0	1	1	2
301 to 350	0	1	1	2	0	0	0	2
351 to 400	0	1	0	1	6	0	6	7
451 to 500	0	0	0	0	2	0	2	2
501 to 550	0	0	0	0	6	0	6	6
601 to 650	0	0	0	0	4	0	4	4
701 to 750	0	1	0	1	3	1	4	5
751 to 800	0	0	0	0	2	0	2	2
801 to 850	0	1	0	1	1	1	2	3
851 to 1,000	0	0	0	0	6	0	6	6
1,001 to 1,500	0	2	0	2	13	5	18	20
1,501 to 2,000	0	1	0	1	2	1	3	14
2,001 to 2,500	0	1	1	2	10	4	14	16
2,601 to 3,000	1	0	0	1	4	3	7	8
Over 3,000	2	1	0	3	3	4	7	10
Unknown	0	0	0	0	6	1	7	7
Total	3	12	3	18	119	22	141	159

Midair collisions in relation to airport proximity

Airport proximity	Collision between							Total
	Air carrier to air carrier	Air carrier to general aviation	Air carrier to military	Subtotal	General aviation to general aviation	General aviation to military	Subtotal	
On airport	0	3	1	4	35	2	37	41
Within—								
¼ mile	1	1	0	2	21	0	21	23
½ mile	0	1	0	1	8	2	10	11
¾ mile	0	1	1	2	3	0	3	5
1 mile	0	1	0	1	6	2	8	9
2 miles	0	2	0	2	14	4	18	20
3 miles	0	1	0	1	4	2	6	7
4 miles	0	0	0	0	3	3	6	6
5 miles	0	0	0	0	9	1	10	10
Beyond 5 miles	2	2	1	5	12	5	17	22
Unknown	0	0	0	0	4	1	5	5
Total	3	12	3	18	119	22	141	159

TABLE No. 4.—*Summary of midair collisions by altitudes and distances from airport (1948–57)*

Altitudes (feet)	On airport	Within (miles) from airport										
		¼	½	¾	1	2	3	4	5	Beyond 5	Unknown	Total
6 to 10	12	0	0	0	0	0	0	0	0	0	0	12
11 to 25	5	0	0	0	0	0	0	0	0	0	0	5
26 to 35	7	2	0	0	0	0	0	0	0	0	0	9
51 to 60	3	1	0	1	0	0	0	0	0	0	1	6
76 to 100	4	3	0	0	0	0	0	0	0	0	0	7
101 to 125	0	1	0	0	0	0	0	0	0	0	0	1
126 to 150	4	0	1	0	0	0	0	0	0	0	0	5
176 to 200	1	7	2	0	0	0	0	0	0	0	0	10
201 to 250	2	0	0	0	0	0	0	0	0	0	0	2
301 to 350	0	0	1	1	0	0	0	0	0	0	0	2
351 to 400	1	0	1	1	2	1	1	0	0	0	0	7
451 to 500	0	0	1	0	0	1	0	0	0	0	0	2
501 to 550	0	0	0	0	2	1	0	1	1	1	0	6
601 to 650	0	3	1	0	0	0	0	0	0	0	0	4
701 to 750	0	2	0	1	0	2	0	0	0	0	0	5
751 to 800	0	1	0	0	0	0	0	0	0	1	0	2
801 to 850	0	0	1	1	0	0	1	0	0	0	0	3
851 to 1,000	0	0	2	0	0	3	0	0	0	0	1	6
1,001 to 1,500	1	1	0	0	2	2	0	4	3	6	1	20
1,501 to 2,000	0	0	0	0	0	2	1	0	1	0	0	4
2,001 to 2,500	0	0	0	0	2	3	1	0	1	7	2	16
2,501 to 3,000	0	1	0	0	1	3	3	0	0	0	0	8
Over 3,000	0	0	0	0	0	1	0	1	1	7	0	10
Unknown	1	1	1	0	0	1	0	0	3	0	0	7
Total	41	23	11	5	9	20	7	6	10	22	5	159

TABLE NO. 5.—*Altitudes and operational phases in midair collisions (1948–57)*

Operational phase	Feet																								Total
	6 to 10	11 to 25	26 to 35	51 to 60	76 to 100	101 to 125	126 to 150	176 to 200	201 to 250	301 to 350	351 to 400	451 to 500	501 to 550	551 to 600	601 to 650	701 to 750	751 to 800	801 to 850	951 to 1,000	1,001 to 1,500	1,501 to 2,000	2,001 to 2,500	2,501 to 3,000	Over 3,000	Unknown	
Takeoff climb	1	0	0	0	2	0	2	0	1	0	2	2	0	0	1	2	0	0	1	1	0	0	0	1	0	16
Landing approach	12	6	9	6	5	1	3	11	1	1	3	0	2	2	1	3	0	2	0	2	0	0	0	0	2	72
Traffic pattern	9	3	6	3	4	1	3	8	1	1	3	0	2	0	2	4	2	3	7	2	1	0	0	0	3	68
Acrobatics	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	1	0	2	0	0	0	6
Buzzing	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	2	0	5
Formation	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	1	3	2	0	1	10
Racing	0	0	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Normal flight	0	0	0	0	0	0	0	0	0	1	1	0	3	0	1	0	2	0	4	12	6	13	6	9	3	61
Intercept [1]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1

[1] Military intercept in ADIZ.

Airport proximities and operational phases

Operational phase	On airport	Within (miles) from airport										Total
		¼	½	¾	1	2	3	4	5	Beyond 5	Unknown	
Takeoff climb	7	2	1	1	2	2	0	0	0	0	1	16
Landing approach	36	20	5	3	4	4	0	0	0	0	0	72
Traffic pattern	27	20	8	2	4	6	1	0	0	0	0	68
Acrobatics	0	0	0	0	1	1	0	2	0	1	0	5
Buzzing	0	1	0	0	0	1	0	0	1	1	1	5
Formation	0	0	0	0	0	1	2	0	2	5	0	10
Racing	0	0	1	1	0	0	0	0	0	0	0	2
Normal flight	0	1	1	0	2	11	6	4	8	23	5	61

NOTE.—Totals in above 2 tables are in excess of the actual 159 collisions because 2 aircraft were involved in each collision and 1 may have been in a different operation from that of the other.

Résumé of midair collisions in United States civil flying (exclusive of aerial crop control operations) (Jan. 1, 1948 to Dec. 31, 1957)

AIR CARRIER AND AIR CARRIER

Date	Location	Aircraft make and model	Injury index	Altitude	Airport proximity
June 30, 1956	Grand Canyon, Ariz.	L-1049 DC-7	Fatal	21,000 feet.	Over 5 miles.
	The 2 flights were cleared from Los Angeles 3 minutes apart. TWA flight 2 was cleared to cruise 19,000 feet IFR to Kansas City. UAL flight 718 was to cruise at 21,000 feet, IFR to Chicago. The 2 flight paths were to cross in the area of the Painted Desert line of position. At 0291 PST, TWA requested 21,000 feet which was denied. It then requested clearance to 1,000 feet on top. At 0956 PST, UAL reported over Needles at 21,000 estimating Painted Desert at 1031. A midair collision occurred at approximately this altitude about 1031 PST at a point off airways and 17 miles west of, and 3½ minutes' flying time from, the Painted Desert line of position. The wreckage of both aircraft fell into the Grand Canyon.				
Aug. 26, 1953	Michigan City, Ind.	CV-240 AA CV-340 UAL	Nonfatal	10,750 feet mean sea level.	Do.
	The collision occurred at 10,750 feet mean sea level over Michigan City, Ind., at 1917 CST. Aircraft involved were American Airline CV-240 flight 714 and United Airline CV-340 flight 314. AA flight 714 returned to Chicago and landed without further incident. UAL flight 314 landed at South Bend, Ind., without further incident. There were no injuries involved to passengers or crews of either aircraft. Weather was C. A. V. U.				
Nov. 17, 1951	Oakland, Calif.	DC-4 ONA DC-4 CEA	Fatal	3,000 feet mean sea level.	¼ mile.
	Both flights were making simulated (hooded) instrument approaches to the Oakland range as part of the 6-month pilot competency check. The 2 aircraft were observed at approximately the same altitude on a converging course. No evasive action was taken by either crew and the aircraft collided. The empennage section of ONA (Overseas National Airways) separated from the fuselage and the aircraft crashed on a highway and burned. 2 automobiles and a light truck proceeding along the highway were involved in the crash fire. 3 of the occupants received serious and 5 minor injuries. The crew on CEA (California Eastern Airways) maintained control of the damaged aircraft and landed at San Francisco.				

Résumé of midair collisions in United States civil flying (exclusive of aerial crop control operations) (Jan. 1, 1948 to Dec. 31, 1957)—Con.

AIR CARRIER AND GENERAL AVIATION

Date	Location	Aircraft make and model	Injury index	Altitude	Airport proximity
Sept. 9, 1956	Bartlesville, Okla.	DC-3 Cessna	Nonfatal	1,000 feet	2 miles.
	The DC-3 was maintaining a straight course in a slight descent preparatory to entering the traffic pattern when a collision occurred. The Cessna pilot, unaware of being near the airport traffic pattern had made a turn prior to the collision. Both pilots maintained control of their aircraft and landed without further incident.				
Aug. 29, 1955	Hobbs, N. Mex.	DC-3 Piper PA-22	do	35 feet	Over approach end.
	The CAL DC-3 with a crew of 3 and 11 passengers was on a straight-in approach to runway 3 when the Piper made a sharp left turn in ahead of the DC-3 and the collision occurred. The DC-3 landed without further incident but the Piper crashed on the airport. The pilot of the Piper sustained serious injuries.				
July 12, 1955	Riverside, Mo.	DC-3 Cessna 140A	Fatal	1,600 feet	1.1 miles.
	A TWA DC-3 with 2 aboard was on a training flight making touch-and-go landings. Following takeoff a climbing turn was initiated to circle the field and land again. The Cessna was a training flight with a TWA pilot as student making a simulated instrument approach to the airport. The aircraft collided 2 miles NW of the range station. The DC-3 landed without further incident but the Cessna crashed and both occupants were fatally injured.				
Jan. 12, 1955	Covington, Ky.	Martin 202A DC-3	do	800 feet	2½ miles.
	TWA Martin 202A and an Executive DC-3 collided in the overcast shortly after the TWA plane took off under an approved instrument flight plan. The DC-3 entered the area without clearance or position report. Both aircraft crashed and burned. 3 crew members and 10 passengers in the Martin and 2 crew members aboard the DC-3 were fatally injured.				
Dec. 15, 1952	Richmond, Ind.	Cessna 170 DC-3	do	5 feet	On airport.
	At the time of the accident the cloud ceiling was estimated to be 500 feet and visibility 5 miles. Icing conditions existed both in and below the clouds. The DC-3 made an instrument approach and as it became visually contact southwest of the airport the pilot was advised by the company agent on the ground, who was monitoring the approach since there is no control tower available, that there was no other traffic. The DC-3 then made an approach to land into the wind on runway 23. It appears that the Cessna approached the airport behind the DC-3 and then cut in for a landing on the intersecting runway 28. Neither the pilot of the Cessna nor crew of the DC-3 apparently observed the other aircraft in time to avoid the collision which occurred at the intersection of the 2 runways as the DC-3 was flaring out for landing.				
Oct. 17, 1952	Near Palmdale, Calif.	DC-3 Lockheed 12A	Nonfatal	2,500 feet	Over 5 miles.
	In making a movie, the Douglas was to pass underneath the Lockheed to				

	permit the cameraman at the door of the Lockheed to get a view of the Douglas flying away. Evidence indicates pilot of the Douglas misjudged the distance from the Lockheed and the right wing struck the underside of the Lockheed. Both aircraft continued in controlled flight and were landed safely.				
June 28, 1952	Dallas, Tex	DC–6 Swift	Fatal	400 feet	1 mile.
	The DC–6 passed over the ILS outer marker VFR and was cleared No. 1 to land. At the same time, the Swift was making a straight-in approach ahead of the DC–6 without clearance. The Swift was assigned No. 2 landing sequence when the tower controller incorrectly identified the Swift as a "Bonanza" and believed it to be behind the DC–6. A few seconds before the aircraft collided the "Bonanza" was advised to give way to the right or left. It then made right turn followed by a left turn into the flight path of the DC–6. The DC–6 crew did not see the Swift until just prior to the collision and just before the No. 4 propeller of the DC–6 sheared the left wing of the Swift, which crashed out of control. The DC–6 landed safely.				
Nov. 27, 1951	Near Ocala, Fla	DC–3 Piper L–4J	do	750 feet	¾ mile.
	The L–4J had completed its first turn after takeoff and the DC–3 was in the traffic pattern. Both aircraft were on the same heading, at the time of collision, with the L–4J slightly lower and climbing. The left propeller of the DC–3 cut into the left wing of the L–4J, which then crashed in a heavily wooded area a short distance from the airport. The DC–3 proceeded to the airport and landed without incident.				
Nov. 9, 1951	Eugene, Oreg	DC–3 Fairchild M62C	Nonfatal	25 feet	¼ mile.
	The DC–3 making a straight-in approach overtook and passed under a Fairchild aircraft an instant before touching down. The crew of the DC–3 felt no impact and was not aware that an accident had occurred until the damaged vertical fin was noted. The Fairchild pilot stated that he thought his approach was too high and that he had collided with a bird. He applied power and headed for another airport but was forced down due to fuel exhaustion. His right fuel tank had been punctured in the collision.				
Nov. 1, 1949	Washington, D. C	DC–4 P–38	Fatal	300 feet	½ mile.
	Airliner was cleared No. 1 to land and was on final approach, at an altitude approximately 300 feet when it was struck by the overtaking P–38. Pilot of P–38, without obtaining proper clearance, made a straight-in final approach and apparently failed to maintain proper lookout for other aircraft. Pilot of P–38 seriously injured.				
Aug. 7, 1949	Milwaukee, Wis	DC–3 Cessna 140	do	1,350 feet	On airport.
	While descending from cruising altitude to land at the Milwaukee Airport, the Douglas crossed over Maitland Field and collided with the Cessna, which was climbing in a left-hand traffic pattern. The Douglas was in a shallow left turn and overtook the Cessna. At the time of impact of Douglas right wing with the Cessna, the Cessna was on an approximate heading of 153° and the Douglas 225°. The Cessna crashed out of control. The Douglas, with severely damaged right wing, continued in flight and was landed at the Milwaukee Airport without further incident. Cessna pilot fatally injured.				

Résumé of midair collisions in United States civil flying (exclusive of aerial crop control operations) (Jan. 1, 1948 to Dec. 31, 1957)—Con.

AIR CARRIER AND GENERAL AVIATION—Continued

Date	Location	Aircraft make and model	Injury index	Altitude	Airport proximity
Jan. 30, 1949	Port Washington, N. Y. Lockheed was climbing VFR to cruising altitude (following takeoff from LaGuardia) while Cessna was in level flight VFR on a right converging course. At the last instant the Lockheed captain observed the Cessna and shoved the control column forward but was unable to avoid a collision. Although Cessna was in a blind spot on Lockheed (Cessna pilot had unobstructed vision) crew could have overcome this by shifting in seat. Evidence indicates crew of Lockheed and Cessna failed to exercise caution and alertness in an area where a heavy concentration of traffic could be expected. Cessna pilot and passenger fatally injured.	Lockheed 749 Cessna 140	Fatal	3,500 feet	Over 5 miles.

AIR CARRIER AND MILITARY

Apr. 10, 1957	Oklahoma City, Okla. The C–46 had been cleared for takeoff on runway 12. The B–25, making a practice GCA approach to runway 17, reached GCA minimums and a missed-approach procedure was started. At the flight convergence of runways 12 and 17 the B–25 struck the C–46 from behind damaging the tail section. Both aircraft remained controllable and the crews were able to effect safe landings.	C–46F AAXICO B–25 USAF	Nonfatal	250 feet	On airport.
June 27, 1954	Columbus, Ohio. AA Convair 240 and a Navy SNB collided during final approach for landing. The Convair with a crew of 3 and 32 passengers landed without further incident. The Navy aircraft crashed and burned, and both occupants were fatally injured.	CV–240 Navy SNV	Fatal	300 feet	0.6 mile.
July 30, 1949	Chesterfield, N. J. A DC–3 airliner was cruising in level flight along airway. Navy pilot was buzzing a small private aircraft, which was cruising at an altitude below the airliner, and had pulled up into a climbing turn colliding with the DC–3. Both aircraft fell in erratic paths and DC–3 burned on impact. Since no evasive maneuvers were observed, it is apparent neither pilots of DC–3 nor Navy pilot observed each other prior to collision. Navy pilot fatally injured.	DC–3 Navy F6F	do	2,000 feet	Over 5 miles.

Oct. 6, 1957	Wheeling, Ill	Cessna 140 Piper J-3	Serious Fatal	200 feet	Edge of airport.
	Piper was No. 1 to land. Cessna cut base leg short and collided with Piper while turning onto final approach. Propeller of Cessna struck left wing of Piper and both aircraft fell to the ground.				
Aug. 18, 1957	Boardman, Ohio	Aeronca 7AC Taylorcraft BC12D	Minor Serious	30 feet	On airport.
	Taylorcraft was terminating cross-country flight. The Aeronca, in the local pattern shooting landings, overtook the Taylorcraft on final approach. The Taylorcraft landed on top of the Aeronca and both aircraft fell to the ground.				
July 26, 1957	Crumrod, Ark	Boig 75N Boig A75	Fatal	50 feet	Unknown.
	Both aircraft were flying tight formation. After buzzing a farm tractor, aircraft pulled up to clear trees at which time the 75N pulled up under the A75, collision occurred, and both aircraft crashed.				
May 22, 1957	Amityville, Long Island, N. Y	Beech 35 Cessna 140A	None Major	30 to 40 feet	On airport.
	The Beech was terminating a cross-county flight. A right-hand traffic pattern was in effect, but Beech used left-hand traffic pattern. Cessna was using right-hand pattern. Both aircraft turned onto final approach from opposite directions. Beech propeller struck the Cessna, severing the vertical fin.				
Apr. 9, 1957	Fort Worth, Tex	Cessna 140 Cessna 170A	Fatal	600 feet	½ mile north of airport.
	Cessna 140 was on a dual student flight practicing landings. Cessna 170A was on an instrument training flight. Collision occurred on the downwind leg of the traffic pattern. Cessna 140 was flying straight and level on a northwest heading on normal downwind leg. Cessna 170A was headed south after reporting over the "low cone" and having been approved for a low frequency range approach. Witnesses observed the Cessna 170A to pull up at which time the collision occurred, striking each other at an angle between 45° and head on. Both aircraft fell nearly straight down, the Cessna 170A bursting into flames. All occupants were killed.				
Mar. 31, 1957	Sturtevant, Wis	Beech C-35 Taylorcraft BC-65	None Minor	10 feet	On airport.
	The Beechcraft was terminating cross-country flight and the Taylorcraft was taking off on local flight. Beechcraft overtook Taylorcraft and its propeller severed the tail of the Taylorcraft. Both aircraft then crashed to the ground.				
Mar. 21, 1957	Colona, Ill	Aero 520 Cessna 310	Fatal None	4,000 feet	2 miles from airport.
	The Cessna 310 pilot was experiencing landing-gear trouble. He requested that an Aero 520 (owned by the same company) fly out to his position to check the landing gear. Aero joined the Cessna at a position behind and to the right, headed in the same direction. Immediately after being advised by the Aero that the Cessna gear appeared to be down, pilot of the Cessna observed the Aero to pass underneath him at which time the collision occurred. Investigation showed the left propeller of the Cessna had cut the Aero from approximately 3 feet below the top of vertical fin to about 4 inches above top of the plastic tail cone.				

Résumé of midair collisions in United States civil flying (exclusive of aerial crop control operations) (Jan. 1, 1948 to Dec. 31, 1957)—Con.

GENERAL AVIATION AND GENERAL AVIATION—Continued

Date	Location	Aircraft make and model	Injury index	Altitude	Airport proximity
Mar. 10, 1957	East St. Louis, Ill.	Luscombe 8E Aeronca 11AC	None	2 feet	On airport.
	The Luscombe pilot was shooting landings and the Aeronca was returning from a cross-country flight. While on final approach, Luscombe overtook Aeronca and its left wheel struck the Aeronca at the center section just prior to touchdown.				
Jan. 31, 1957	Sunland, Calif.	DC-7B Douglas Co.[1] F-89J Air Force [1]	Fatal	25,000 feet	Beyond 5 miles.
	Both aircraft were observed prior to the collision at an altitude of approximately 25,000 feet, and appeared to be in straight and level flight. The DC-7 was on a nearly due west heading and the F-89 on a nearly due east heading. The DC-7, with a portion of the left wing sheared off, descended out of control and crashed in a school playground area and burned. The F-89 burst into flames as it also descended out of control and crashed in the mountains. The radar operator ejected from the F-89 about half way down and parachuted to safety. Although visual flight conditions prevailed at the time of the accident, it was determined that with an estimated visual range of 3.5 miles, and a closure speed between the 2 aircraft of 700 knots over the probable flight paths, the time to collision from visual range was about 15 seconds.				
Jan. 20, 1958	Tulsa, Okla.	Cessna C-165 Swift GC-1B	None	20 feet	On airport.
	Both aircraft were approaching for landing. Each had used approved traffic pattern procedure. Swift overtook and struck the Cessna from above. Weather was hazy and sun was low on the horizon.				
Dec. 9, 1956	Tampa, Fla.	Aeronca 7AC Cessna 140	Serious None	100 to 150 feet	Do.
	Solo student in Aeronca lined up with the east-west runway, landing to the east. After passing the boundary of the field he noted another aircraft to the right taking off from the northeast runway and he attempted to pull up and go around and thought he stalled out. The instructor in the Cessna noting others using the northeast runway entered the pattern downwind for northeast runway for a touch-and-go landing. After touchdown, student was instructed to take off again. Nearing the intersection of east and northeast runway, the instructor saw the Aeronca landing and took over the controls and made a right turn to avoid collision, however, the aircraft collided at approximately the intersection of the runways. The instructor in the Cessna closed the throttle and landed on the airport.				
Nov. 27, 1956	Okanogan, Wash.	Stinson 108-2 Cessna 170B	do	50 to 75 feet	1,500 feet from airport.
	Cessna pilot observed no other traffic and made a right turn for a straight-in approach. The Stinson entered the pattern 3 miles south of airport on a long straight-in approach. About 1,500 feet from the end of the runway at about 50 to				

[1] The DC-7B was being flight checked following production. Its crew were all employees of Douglas Aircraft Co. The F-89J was being flight checked following an overhaul performed under contract by Northrop Aircraft Co. for the Air Force. Both crew members were employees of Northrop.

	75 feet, the Cessna's strut and left wing contacted the Stinson's right wing. The aircraft were parallel laterally at the time of impact. The vertical angle was about 25°. The Stinson landed in a field adjacent to the airport before complete control could be regained. The Cessna pulled up, proceeded around the field and made a normal landing. Visibility in the Cessna was limited due to frosted condensation on the right side of the windshield and side windows.				
Oct. 20, 1956	Deer Park, N. Y.	Cessna 140 Globe GC1A	Serious None	10 feet	On airport.
	As the Cessna approached, the instructor noted that the wind tee was aligned with the southeast runway. It had changed from the northeast since takeoff. The aircraft was levelled off over the end of the southeast runway at about 5 to 8 feet. Crossing the intersections, expecting touchdown, the instructor saw the Globe, right wing down, to the right and slightly to the rear of Cessna. The planes collided at the intersection, the Globe striking the Cessna just aft of the cockpit. The Swift landed right side up, but the Cessna struck the ground nose down and turned over on its back.				
Sept. 11, 1956	Johnstown, Ohio	Navion Beech C35	Fatal	800 feet	10 miles.
	The Navion was on VFR flight plan en route to Allentown, Pa., from Royal Oak, Mich. The Beech had departed Youngstown for Erie and was flying in a northeast direction. At the time of the accident, the Navion was flying in a westerly direction. The aircraft collided about 10 miles northeast of the Youngstown airport at about 800 feet above the ground while in level flight. The left wing of the Navion tore loose and fell to the ground separate from the rest of the aircraft. The aircraft fell to the ground about 1 mile apart and were demolished.				
Sept. 13, 1956	Alamogordo, N. Mex.	Cessna 140 Cessna 180	do Serious	75 feet	On airport.
	Cessna 140 on dual instruction flight took off southwest. Cessna 180, on a business trip, took off south-southeast. Wind conditions were calm. Both aircraft collided at the point where the southwest and south-southeast runways intersect. They remained twisted together, fell to the ground, and were demolished. Cessna 180 was observed to start a shallow right turn just prior to the collision. Neither pilot observed the approved takeoff traffic pattern for the airport.				
Aug. 25, 1956	Hyannis, Mass.	Cessna 170A Piper PA-22	Fatal None	600 feet	In traffic pattern.
	Cessna 170A was making a long, straight-in final approach after a local revenue sightseeing flight. Piper PA-22 was on a cross-country flight and was flown by a student pilot who was not endorsed for cross-country operation. Evidence shows that the left wing of the Piper collided with the left side of the fin of the Cessna as the Piper was executing a left turn from base leg onto final approach. Following the first contact, the left wing of the Piper then contacted the right wing tip of the Cessna at the trailing edge. The Cessna then rolled into a spin, crashed and burned. The Piper was able to effect a safe landing.				

Résumé of midair collisions in United States civil flying (exclusive of aerial crop control operations) (Jan. 1, 1948 to Dec. 31, 1957)—Con.

GENERAL AVIATION AND GENERAL AVIATION—Continued

Date	Location	Aircraft make and model	Injury index	Altitude	Airport proximity
July 20, 1956	East St. Louis, Ill.	Stinson 108 Cessna 180	Fatal	150 feet	On airport.
	Witnesses reported that the Stinson took off on the north runway. The Cessna took off on the northwest runway at approximately the same time. Upon reaching 150 feet, the aircraft collided at the north edge of the airport where the north and northwest runways intersect. The Cessna hit the landing gear of the Stinson, shearing off the Cessna's left wing. The Cessna proceeded underneath the Stinson for approximately 100 feet and crashed in an inverted position and caught fire. Both aircraft were demolished.				
June 23, 1956	Pontiac, Mich.	Piper PA-14 Piper J3C65	do	800 feet	¼-mile.
	The PA-14 was lead aircraft in a 3-plane formation on cross-country flight. It was operating along a route that put it in the traffic pattern of the Pontiac Airport. The J3C65, making a local test flight, was observed to take off, fly a standard left circuit traffic pattern to a position about midway on downwind leg (northwest heading) to land southeast. The PA-14 was crossing the airport on a northeast heading at about 800 feet. This put the 2 aircraft on 90° converging course. One witness stated that, just prior to contact, the PA-14 attempted a left turn too late to avoid a collision. The PA-14 reportedly struck the J3C65 on the left top side, the left wheel catching the left wing of the J3C65. It then evidently rolled to the right over the J3 and the propeller of PA-14 cut the right wing of the J3. Both aircraft crashed nose down and were demolished.				
June 21, 1956	Seattle, Wash.	Beech C35 Cessna 140	do	1,000 feet	Approximately ½ mile in traffic pattern
	Beech was on cross-country flight; Cessna, on training flight, shooting landings and takeoffs. The Beech reported south of the field, and, upon request, was given instructions to enter traffic (right) for runway 30. Witness observed the Cessna, which had just taken off, rolling out of a right turn onto the downwind leg of traffic pattern, at about 1,000 feet and in a 5° bank. The Beech was noted to be closing rapidly from behind, from the northeast, as if to enter the traffic pattern. Less than 100 feet separated the 2 aircraft. It appeared to witness that the Beech, just before impact, attempted evasive action, pulling up into a climbing left turn. The observer thought the Beech right wing struck the root of the Cessna left wing and that an explosion occurred at impact. Another witness reported that the Beech right wing then came floating down and the Beech rolled on its back and went down at 45° to 60° angle. Aircraft started to burn approximately 2 minutes after striking the ground. The Cessna rolled left and went into an inverted spin. Both aircraft were demolished.				
May 16, 1956	Flint, Mich.	Cessna 170 Cessna 140	do	Unknown	1½ miles.
	Cessna 170 was engaged in dual instruction; Cessna 140 was believed to be on local pleasure flight. Cessna 170 contacted the control tower, reporting position				

	as 5 miles southwest of airport, and requested landing instructions. He was cleared to enter the traffic pattern for runway 27. At about the same time, Cessna 140 was cleared for takeoff on runway 22 since another aircraft was making a simulated ILS approach to runway 27. After takeoff, Cessna 140 reported he was leaving the pattern and was observed proceeding straight ahead on southwest heading, clear of observed traffic. Control tower made 2 attempts to contact Cessna 170 at this time, but no replies were received. The aircraft collided 1½ miles southwest of the airport, about 200 yards north of the extended centerline of runway 22, crashed, and were demolished.				
May 13, 1956	Ramsey, N. J.	Beech 35 Aeronca 7AC	None	2,000 feet	Unknown (outside traffic pattern).
	Aeronca was flying at 2,000 feet on southeasterly heading when the aircraft was overtaken by the Beech from the rear. The lower left wing of the Beech struck the top of the rudder of the Aeronca, bending the top 6 inches of the rudder to the left. The bottom wing skin of the Beech was torn from the leading edge to the front spar. Both aircraft landed without further incident.				
Apr. 13, 1956	San Carlos, Calif.	Stinson L5G Cessna 140	do	25 feet	On airport.
	Student pilot in Stinson was performing power-off 180° side approach. Instructor in Cessna was on final approach when Stinson was turning base at higher altitude. The Stinson turned on final directly over the Cessna. Both continued their glides in close proximity to boundary of the airport. Witnesses report that the Cessna flared out while the Stinson continued its descent. As Stinson flared out for landing, its underside contacted the top of the Cessna. The planes locked together at approximately 25 feet and landed interlocked. They rebounded once and contacted ground again where they cartwheeled over the right wingtip and skidded off the runway.				
Mar. 31, 1956	West Chicago, Ill.	Cessna 140 Piper PA–18	Serious Fatal	200 feet	½ mile.
	Both aircraft were observed by witnesses on final approach to southeast runway. Piper was approaching from the north in a straight line. Cessna was coming from the east, turned on final, cutting behind the Piper, above and slightly to the right of it. The Cessna apparently overtook the Piper, according to witnesses, and the aircraft were seen to collide and lock wings—the left wing panel of the Piper and right wing panel of the Cessna. After the collision one of the pilots applied power, resulting in both aircraft assuming a nose-high attitude and rolling to the right. They then separated and fell to the ground.				
Feb. 8, 1956	Helena, Mont.	Piper PA–12 Cessna 172	Minor Fatal	2,000 feet	Unknown.
	Piper pilot was on a local flight, flying south. Cessna was on a demonstration flight. A passenger observed the Cessna directly ahead. Warned by the passenger, the Pipe pilot started a steep turn to the left but not soon enough to avoid collision. The Cessna right wing struck the right front cylinder of Piper engine, the right wheel and right wing root. The Piper windshield was knocked out. Piper entered a steep glide and was turning slightly to the left. Before contacting the ground the Piper was brought under partial control, although pilot had no rudder control. The Cessna right wing was damaged in the collision and was carried away by the Piper. It crashed out of control in vertical descent and was demolished.				

Résumé of midair collisions in United States civil flying (exclusive of aerial crop control operations) (Jan. 1, 1948 to Dec. 31, 1957)—Con.

GENERAL AVIATION AND GENERAL AVIATION—Continued

Date	Location	Aircraft make and model	Injury index	Altitude	Airport proximity
Oct. 31, 1955	Baton Rouge, La.	Cessna 170B Piper PA-22	Minor	30 feet.	On airport.
	Both aircraft were approaching the airport at the same time and altitude. The Piper was landing to the south and the Cessna to the southeast. Just as each flared for landing they collided. The Cessna left wing leading edge struck the Piper right wing lift struts about midway, collapsing them. Both aircraft crashed.				
Oct. 26, 1955	Visalia, Calif.	Boeing PT17 Aeronca L3	None	800 feet.	1½ miles.
	The Boeing was en route at 800 feet in the vicinity of the airport, lined up with the normal downwind leg of runway. The pilot of the Aeronca stated that on downwind leg he saw the Boeing slightly higher and to his right. To avert a head-on collision he pushed the nose of the Aeronca down and started a left turn. Part of the Aeronca right wing passed through the Boeing propeller path and crashed into the lower right wing of the Boeing. After the collision both pilots effected safe landings at the airport.				
Oct. 15, 1955	Worth Township, Ill.	Piper PA-22 do.	None Fatal	1,000 feet.	Do.
	Plane A was on cross-country flight. Plane B was on an instrument instruction flight on the Joliet or Harvey range. The pilot of plane A reported that, while cruising at 1,000 feet, he suddenly saw another aircraft coming directly at him, at the same altitude, in level flight. He put plane A into a left climbing turn to avoid the other aircraft. The collision occurred adjacent to and slightly northwest of the point where the north leg of the Harvey range and the east leg of the Joliet range intersect. Plane B crashed to the ground. The pilot of plane A entered the airport traffic pattern and landed without realizing his right main landing gear had been damaged in the collision. No further damage to plane A during landing and rollout.				
Sept. 3, 1955	South Portland, Maine.	Piper J3 Aeronca 7AC	None	100 to 200 feet.	800 feet.
	The Piper entered the pattern at 800 feet and began downwind leg. At 200 feet it began final approach. The Aeronca had made a regular pattern, made last 90° turn, leveled off into a glide and began final approach. Neither pilot observed the other aircraft. About 800 feet from the runway the left wing of the Aeronca struck the top of the Piper fuselage aft of the cabin. The Aeronca leading edge and nose ribs outboard of the left wing strut were damaged. The top of the Piper fuselage, fabric and right upper longeron were damaged. Both aircraft were landed without further damage. The Aeronca pilot landed from his approach while the Piper pilot circled and landed. Control surfaces were not damaged.				
Aug. 27, 1955	Salem, Oreg.	Piper PA-14 Stinson L5E	Fatal Minor	800 to 1,000 feet.	½ mile.
	The Piper was on downwind leg about ½ mile west of the field in a southerly direction. The Stinson entered the pattern at a 45° angle, slightly above and to the right of the Piper. The pilots failed to see each other in time to take evasive				

	action. The left wheel of the Stinson contacted the Piper in the lower windshield area and the left landing gear strut struck the Piper left wing root fairing. Impact forces were so great the left wing of the Piper was demolished and the aircraft fell to the ground out of control. Fire after impact. The Stinson lost a propeller blade and the left landing gear strut and attachment fittings were driven into the fuselage, resulting in limited use of controls. The Stinson continued with partial control in a left spiral turn, contacting the ground in a 20° nose-down attitude.				
June 30, 1955	Middletown, Ohio	Taylorcraft BC12D1 Piper PA-23	None	Unknown	1 mile.
	The Taylorcraft was overtaken and struck from above as it turned on final approach approximately 1 mile from the end of the runway. The Piper also was turning on final approach. The Taylorcraft vertical fin was bent 90° left; fabric on top left side of fuselage was torn; and trailing edge of left wing was damaged. The Piper right wing tip was damaged. Both aircraft were landed without further damage.				
June 21, 1955	Chesapeake Bay, Va	Piper PA12 do	Fatal	800 to 1,000 feet	Unknown.
	1 aircraft was observed flying westerly, the other northeast. Both aircraft apparently entered a left hand turn, and both pilots evidently were looking out of the left side of their respective aircraft. In so doing, the aircraft came together in an almost head-on collission, contacting each other's wings and crashed.				
June 4, 1955	Near Hastings, Minn	Piper J3C65 do	None	1,200 feet	5 miles.
	2 solo students were flying parallel on the same cross-country route. As they drew near a check point, pilot A was looking at his watch and map trying to compute their ETA, while pilot B was recording time, etc. During this period, plane A collided with plane B, its right wing piercing the fuselage of plane B. Both planes went into a spiral to the left. When they separated, both pilots managed to execute forced landings with little landing damage.				
May 26, 1955	Anchorage, Alaska	Taylorcraft BC12D Cessna 140	Minor Fatal	1,139 feet	6 miles.
	Instructor and student were in Taylorcraft. Student was executing S turns. Upon the completion of one S turn, after rolling out of bank into straight and level flight, instructor caught a glimpse of the Cessna 30° to the right of his aircraft. Collision was immediate. After impact, the instructor took over control of the aircraft and landed safely at the airport. The Cessna lost its left wing which fell to the ground, landing 1,500 feet from the rest of the aircraft. The Cessna occupants were fatally injured.				
May 8, 1955	Cleveland, Miss	Beech 35 Piper PA12	do Serious	25 feet	On airport.
	The airport is an L-shaped field. Aircraft was making simultaneous approach: Beech from the south, aligned with north-south runway; Piper from the west, aligned with east-west runway. The wind was 8 miles per hour from the northeast. The aircraft collided at an altitude of 25 feet in the vicinity of the intersection of the runways, the Piper contacting the Beech on its left side. The Piper continued east for about 75 feet and came to rest inverted. The tail of the Beech was completely separated from the fuselage; it came to rest inverted on the north-south runway.				

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GENERAL AVIATION AND GENERAL AVIATION—Continued

Date	Location	Aircraft make and model	Injury index	Altitude	Airport proximity
May 8, 1955	Pontiac, Mich	Fairchild 24 Cessna 170	None	3 to 10 feet	On Airport.
	Both aircraft were coming in on a long final approach. Cessna was in front with the Fairchild several hundred feet behind and above the Cessna. The Fairchild slowly overtook the Cessna and they came together just as the Cessna was about to stall for landing. The Fairchild propeller contacted the Cessna rudder. The Cessna completed its landing. The Fairchild applied full power, pulled up in a left turn and passed over the Cessna. It then landed on the airport.				
May 1, 1955	Fayetteville, Ark	Pitts Special Ercoupe	do Fatal	40 feet	Do.
	Both aircraft were on final approach, the Ercouue lower than the Pitts Special. The Pitts Special overtook and collided with the rear of the Ercoupe at an altitude of approximately 40 feet. Both aircraft crashed and burned.				
Apr. 17, 1955	Macon, Ga	Piper J4F Cessna 170A	None	1,500 to 2,000 feet	5 miles.
	Aircraft were in formation flight to take aerial photos of the Cessna. After the photos were taken the Cessna, flying left wing of the Piper, peeled off to the left in a climbing turn and the Piper peeled off to the right in a diving turn. The Cessna leveled out after 90° of the left turn and retracted flaps. In the meantime the Piper had executed a 270° diving turn to the right. When the Cessna retracted flaps without applying more power it descended so that the right wing made contact with the left section of the horizontal stabilizer of the Piper. Piper made a forced landing in an open field and nosed over. The Cessna flew back to the airport and landed safely.				
Feb. 24, 1955	Louisville, Ky	Aeronca 7AC Aeronca 7BCM	do	2,000 to 2,500 feet	10 miles.
	3 planes were flying in close formation. Pilot of Aeronca 7AC made an abrupt left turn to go behind the plane to his left, but the 7AC collided with the 7BCM (to the left) just as it was rolling out of the turn. Both planes returned to the airport and landed safely.				
Feb. 20, 1955	Trenton, N. J	Cessna 180 Piper PA12	do	100 to 200 feet	300 feet.
	Both aircraft were on final approach. The Piper PA12 pilot observed a Piper J4 in front of him on downwind leg. He flew at 70 miles per hour at 800 feet. When the J4 was on final approach, pilot of PA12 went to 95 to 100 miles per hour and extended his downwind leg 1,000 feet. He turned on final at 600 feet and reduced speed to 70 miles per hour. The Cessna pilot also noticed the J4 in front of him on downwind leg. He reduced airspeed to 80 miles per hour and extended his downwind leg 1,000 to 1,200 feet. When the J4 touched down, Cessna pilot turned on final at 800 feet, applied full flaps and reduced airspeed to 60 miles per hour. The Cessna was approximately 100 feet above the PA12 as they reached the end of the runway. It then dived steeply into the PA12, passing				

	under and to the left of the PA12. The Cessna proceeded to make a normal landing. The PA12 pulled up, circled, and landed safely. It taxied behind the Cessna which was then parked on the left side of the runway to make a cursory inspection. After this, pilot of PA12 attempted to maneuver around the Cessna as close as possible and collided with the right aileron and wingtip of the Cessna. The left wingtip of the PA12 was damaged in the ground collison.				
Feb. 19, 1955	Compton, Calif.	Cessna 180 Taylorcraft BC12D	do Minor	500 feet	1,500 to 2,000 feet.
	Cessna overtook Taylorcraft during climb following takeoff and aircraft collided at about 500-foot altitude. Cessna contacted Taylorcraft from right rear, the wheels striking the top of the cabin and top of right wing. Left wheel went through the cabin top, striking the pilot. Impact forced the Taylorcraft into a dive, but the copilot regained control and landed at Compton Airport. Cessna pilot pulled up and flew to Los Angeles where the aircraft was landed with damaged gear.				
Dec. 19, 1954	Lincoln, Nebr.	Luscombe 8A Aeronca 7AC	Fatal	400 feet	1 mile.
	The Aeronca took off from a sod runway. At about the time the Aeronca became airborne, the Luscombe took off from the hard-surfaced runway. There was a lateral separation of approximately 1,000 feet between the sod and hard-surfaced runways. According to witnesses, both aircraft maintained their south heading and apparently maintained the same separation as on takeoff. The Luscombe overtook the Aeronca which was slightly above it. At a point just ahead of the Aeronca and approximately 1,000 feet to the right, the Luscombe began a left climbing turn which was continued until the Luscombe collided with the Aeronca. It struck the Aeronca with the right wingtip just ahead of the right lift struts. 6 feet of the Luscombe's right wingtip was sheared off and it spun in over the top and crashed into the powerlines. Fire on impact. The Aeronca, although damaged, effected a safe landing.				
Oct. 31, 1954	Milwaukee, Wis.	Cessna 140 (A) Cessna 140 (B)	do	do	¾ mile.
	Just after plane A took off on southwest runway, plane B, which had been making takeoffs and landings, rolled down the runway and made a running takeoff from a parallel turf strip. Both planes were climbing in a close, parallel attitude so that it was difficult for the pilots to observe each other. Plane A leveled off at 400-foot pattern altitude, cleared himself behind and to the sides and started a 90° left turn and collided with plane B which was still climbing. The propeller of plane A cut through the aft portion of the fuselage of plane B. Plane A continued to a safe landing while plane B crashed out of control. Visibility to the southwest was poor because of haze and the setting sun.				
Sept. 25, 1954	Urbana, Ill.	Piper PA-11 (A) Piper PA-11 (B)	None	3,500 feet	5 miles.
	According to pilot's statement, pilot took off in plane A behind plane B from Urbana, both en route cross country. While flying to the right and behind plane B, an L-16 aircraft passed between planes A and B, after which pilot of plane A changed his position to fly on the left of plane B. Shortly thereafter, pilot looked down and back and saw his aircraft slipping into plane B. He was unsuccessful in his attempt to give way to the right and the planes collided. Plane A became nearly uncontrollable and crashed. Witnesses state that pilot of plane B was attempting to fly formation. Plane B landed in an adjacent field.				

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GENERAL AVIATION AND GENERAL AVIATION—Continued

Date	Location	Aircraft make and model	Injury index	Altitude	Airport proximity
July 31, 1954	Altus, Okla	Piper PA-18 Cessna 140	Fatal Serious	75 feet	Adjacent to airport.
	Planes were flying converging courses preparatory to landing on adjacent fields. Piper (duster) was flying south on a straight-in approach to duster landing strip. Cessna was making approach to the southeast to municipal airport. Left horizontal stabilizer of Cessna caught right side of cabin area of Piper. The aircraft then turned so that the Piper propeller cut the Cessna fuselage. Cessna fell away and crashed. Piper landed in the rough on the airport.				
Do	Ridgecrest, Calif	Ercoupe 415CD Ercoupe 415C	Fatal	2,500 feet 3,500 feet	2 miles.
	Both planes had been flying in formation. Plane A (Ercoupe 415CD) had planned to descend out of formation and execute rolls, then pull back up again, and plane B (Ercoupe 415C) was to fall in formation to the right and behind plane A. This was accomplished. When plane A began to slow down gradually in a letdown, plane B turned to the right and applied power, intending to break the formation. A few seconds after starting its turn the planes collided, the propeller of plane B evidently cutting into plane A. Plane A dove into the ground following the collision. Plane B was able to make a normal landing on the airport.				
July 26, 1954	Wheeling, Ill	Piper J3F Cessna 140A	Nonfatal	150 feet	⅛ mile.
	Pilots failed to see each other and the aircraft collided on final approach when Cesssna right wing contacted the under surface of the Piper's left wing, ripping the fabric and breaking 3 ribs. Both aircraft had just entered traffic pattern prior to collision.				
June 24, 1954	Bellevue, Wash	Cessna 140 Piper PA-11	Fatal Serious	500 feet	1 mile.
	The Piper, returning from a training flight, had entered the normal traffic pattern and was headed east on his base leg just prior to turning on final when it was struck by the Cessna, returning from a sightseeing trip to Seattle, just to rear of right wing trailing edge as both aircraft were landing to the north. Piper was on an east heading and turning north on his final; the Cessna was on a northerly heading, making a straight-in approach from the south. Both aircraft crashed.				
June 20, 1954	Fostoria, Ohio	Aeronca 7AC (A) Aeronca 7AC (B)	do	400 feet 500 feet	2 miles northeast.
	According to witnesses, both aircraft took off almost simultaneously with aircraft A slightly ahead of aircraft B. Takeoff was made to the east. A normal traffic pattern was flown with both aircraft making the usual 45° turn out of the pattern. Both were headed in a northerly direction. 2 witnesses state that prior to the collision aircraft B was seen to be a little below aircraft A. Examination				

	of the aircraft indicates that the right wingtip of plane B first made contact with left side of the fuselage of plane A midway between the cabin and the empennage. According to witnesses, the planes spun a few revolutions before they came apart. Aircraft A made a dead-stick landing in a field with no further damage in landing. The manner in which aircraft B came to rest indicated an almost vertical descent while in a flat or level attitude.				
May 6, 1954	Council Bluffs, Iowa	Beech 35 Piper J3	Nonfatal	200 feet	¼ mile.
	Beech entered the traffic pattern for a northeast landing. While in a left turn to the final approach it collided with the Piper which was on final approach at a lower altitude for a northeast landing. The Beech continued its approach and landed on the airport; Piper made a turn of 270° and landed in an open area.				
Apr. 24, 1954	Torrance, Calif	Piper PA–15 Mooney MC–18	Fatal Minor	900 feet	1 mile.
	According to witnesses, planes had been engaged in buzzing and making close passes. Piper had entered the traffic pattern at 45° angle to the downwind leg and turned to start its downwind leg when the Mooney, converging from the right, flew under the Piper and pulled up so as to catch his empennage on the Piper's lower right side; the Mooney crashed and burned. The Piper landed on the airport.				
Apr. 4, 1954	Irving, Tex	Interstate S–1A Tomahawk Special	Fatal	1,400 feet 1,500 feet	¼ mile.
	Witnesses described planes as engaging in "dogfight" at 1,400 to 1,500 feet and that Tomahawk came up under the Interstate and collided with it. The Interstate lost a wing and spun almost vertically to the ground. The Tomahawk, which lost part of its left wing, went into a flat spin and apparently recovered but eventually crashed out of control.				
Feb. 27, 1954	Horsham Township, Pa	Cessna C–165 Beech 35	do	3,000 feet	1 mile.
	The Beech was on cross-country flight from Wilkes-Barre, Pa., to Camden, N. J., on VFR flight plan. Cessna was on cross country from Westchester, Pa., to Meriden, Conn. The aircraft collided. The Beech was on a course of 160° T; the Cessna was on a course of 54° T. The angle of convergence between the two courses was 106°, with the Cessna approaching the Beech on the right and 16° in front of the Beech's right wing. Witnesses state that after impact the Beech continued approximately along its course line, shedding first its left wing, then its tail; then it "tumbled end over end to the ground." The Cessna momentarily righted itself, then spun to the ground.				
Feb. 23, 1954	Camden, Ark	Cessna 120 Piper J3	Nonfatal	25 feet	On airport.
	Piper, attempting a landing on the ramp contrary to approved traffic pattern for the area, collided with Cessna landing north-south runway. Piper pilot was attempting a landing on an area which is used by local pilots when judgment dictates that a safer landing can be made into the wind on the shorter strip than crosswind on the north-south runway.				

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GENERAL AVIATION AND GENERAL AVIATION—Continued

Date	Location	Aircraft make and model	Injury index	Altitude	Airport proximity
Jan. 9, 1954	San Carlos, Calif.	Cessna 140 Taylorcraft BC12D	Nonfatal	2,500 feet	1½ miles.
	While returning to Palo Alto Airport Cessna pilot let down from 3,500 feet making clearing turns. During letdown, at approximately 2,500 feet, Cessna collided with a cruising Taylorcraft which had taken off from San Carlos-Belmont Airport a few minutes before. After rolling out of a right turn of approximately 90°, Cessna brushed over the topside of the Taylorcraft, damaging its fuselage, left aileron and left wing. Both aircraft remained operable and each pilot returned to respective base and landed safely.				
Dec. 26, 1953	Lincoln, Mass.	Stinson 108 Cessna 140	do	1,000 feet	1 mile.
	The Stinson was on the downwind leg of a landing approach and the Cessna was descending in a left turn when the collision occurred. Both aircraft crashed out of control and were demolished by impact. Fire followed impact in the Stinson. Both pilots and passenger in the Cessna sustained serious injuries.				
Dec. 12, 1953	Lafayette, Ind.	Cessna 120 Taylorcraft BC12D	do	200 feet	½ mile.
	The Taylorcraft pilot was making a long final approach while the Cessna was on a short pattern. The Cessna pilot made a steep turn to the final approach and collided with the Taylorcraft which crashed out of control and its pilot seriously injured. The Cessna landed safely and the 2 occupants were not injured.				
Nov. 1, 1953	Tampa, Fla.	Ercoupe 415 Piper PA-22	do	20 feet	Over airport.
	The Ercoupe with an instructor and student was taking off from runway 3 and collided with the Piper which was landing on runway 10. Both aircraft were substantially damaged but landed without further incident. The instructor in the Ercoupe sustained serious injuries and the other 2 persons involved were not injured.				
Oct. 16, 1953	New Orleans, La.	Taylorcraft BC12 Aeronca 7AC	do	80 feet	Airport boundary.
	Both solo students were approaching for a landing and collided over the approach end of the runway. Both aircraft were substantially damaged but were landed without further incident. Neither student was injured.				
May 10, 1953	Compton, Calif.	Ercoupe 415C Cessna 140	do	150 feet	On airport.
	Pilot in Ercoupe states he did not see the Cessna at any time. Cessna was on final approach and the Ercoupe overtook and cut in ahead and the tail was struck by the Cessna propeller. Cessna was safely landed. Ercoupe crashed out of control.				

May 6, 1953	Salt Lake City, Utah	Cessna 140 Swift GC1B	do	Unknown	5 miles.
	Appears pilot in Cessna overtook the Swift and saw it the instant prior to collision. Swift wing tip was cut by Cessna propeller. Both aircraft were safely landed.				
Nov. 23, 1952	Quincy, Ill	Beechcraft 35 Cessna 170A	do	75 feet	On airport.
	The Beechcraft overtook the Cessna colliding with it from above and behind. The 2 aircraft then crashed out of control. The Beechcraft pilot apparently failed to enter the prescribed local traffic pattern for an uncontrolled airport. However, it also appears the Cessna pilot failed to contact Quincy radio for reported traffic, which was done by the pilot of the Beechcraft.				
Oct. 19, 1952	National City, Calif	Cessna 140 Luscombe 8A	do	500 feet	1 mile.
	The Cessna followed the Luscombe on takeoff and both pilots followed the prescribed traffic pattern. However, being slower the Luscombe took much longer to gain altitude before making the first turn and the Cessna pilot thought he was leaving the pattern. Luscombe was on the downwind leg as the Cessna was in a left turn entering the same leg and the right wing tip was struck by Luscombe propeller. Pilot in Luscombe saw the Cessna the instant prior to collision and pulled up to avoid it. Luscombe was safely landed and the Cessna, under partial control due to damaged wing tip and aileron, was crash landed in a swamp.				
Oct. 7, 1952	Compton, Calif	Swift GC1B Luscombe 8A	do	5 feet	On airport.
	The Swift was leveled off at approximately 4 feet when it was struck from above by the Luscombe which was being flared out for landing. According to the statement of a witness the navigation lights of the Swift were not turned on as he watched it take off. The Luscombe pilot states he had slipped his aircraft and had a clear view of the runway but did not see any aircraft lights.				
Sept. 21, 1952	Compton, Calif	Cessna 140 Aeronca 7AC	do	do	Do.
	Cessna overtook the Aeronca and landed on top of it as Aeronca was leveled off for landing. Cessna pilot states he at no time observed the Aeronca ahead and below him, indicating a lack of alertness while landing on a busy airport.				
July 27, 1952	Leechburg, Pa	Luscombe 8A Cessna 140	do	do	On airport.
	Although the long north-south runway was generally used, except under strong wind conditions, it appears no clearly defined field rules were posted. Pilot in Cessna was landing west into a 15-miles-per-hour wind and was leveling off when struck by the Luscombe taking off north. Luscombe pilot had been advised by airport manager to use north-south runway. Terrain was such that pilot at end of either runway could not see aircraft on the other end of bisecting runway. No tower on field nor stationary tee to indicate runway under no-wind conditions.				
June 8, 1952	Los Angeles, Calif	Cessna 120 Cessna 140	do	800 feet	¾ mile.
	Cessna 120 was on the downwind leg and Cessna 140 either just entered, or was entering the pattern, when the collision occurred with forward part of Cessna 120 hitting tail of 140. Neither pilot saw the other until the instant prior to collision when student in 120 saw the other aircraft. Both were then safely landed.				

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Date	Location	Aircraft make and model	Injury index	Altitude	Airport proximity
June 6, 1952	Nitro, W. Va.	Stinson 108 Piper PA-11	Fatal	650 feet	¼ mile.
	Pilot in Stinson failed to make proper entry into the traffic pattern and overtook the Piper which was then on the downwind leg. Following the collision, the Stinson immediately crashed out of control. Piper pilot apparently attempted to land the disabled aircraft but lost control at a low altitude and dived into the ground.				
Feb. 24, 1952	Moorestown, N. J.	Aeronca 7AC Waco UIC	do	1,500 feet	4 miles.
	Appears the 2 aircraft were flying parallel with the Aeronca to the left and slightly ahead of the Waco. Evidence indicates the Aeronca pilot, after making a steep right turn, saw the Waco and tried to pull up. Left wings of Waco were sheared and Aeronca empennage was severed with both aircraft then crashing out of control.				
Nov. 9, 1951	Near Browning, Mont.	Piper PA-18 Aeronca 7CCM	do	Unknown	¼ mile.
	There were no witnesses to the collision; however, a hunter in the vicinity did see the Aeronca which appeared to be on final approach for landing. He then next noted Aeronca disappearing behind tree and heard an explosion and on investigation located wreckage of Aeronca. Piper was never seen and the wreckage was discovered the next day. Evidence indicates the Piper was flown into the left side of the Aeronca.				
Aug. 29, 1951	New Orleans, La.	Fairchild M62A Cessna 120	Nonfatal	150 feet	On airport.
	Cessna was coming in on a long final approach while Fairchild was making a high short final and student saw Cessna at the last instant. As student pulled up in the Fairchild, the tail wheel hit left wing of Cessna. Both students landed without further incident. (Inadequate traffic pattern at airport to be remedied.)				
June 3, 1951	San Jose, Calif.	Cessna 120 Aeronca 7AC	Fatal	1,000 feet	5 miles.
	Cessna was flying in a southeast direction while Aeronca was headed northwest and appeared slightly lower. The left wings on the 2 aircraft struck and both aircraft crashed out of control. (It is believed both pilots may have diverted their attention to a rodeo in the near vicinity and consequently did not see each other.)				
May 20, 1951	Chattanooga, Tenn.	Pack & Assoc. D Wittman Racer	Nonfatal	50 feet (estimated)	¾ mile.
	Both aircraft were turning on scatter pylon in a closed course race and neither pilot observed the other aircraft prior to collision. Appears Wittman momentarily straddled Pack D. Both pilots maintained control and landed. Pack D groundlooped and Wittman nosed up during landing.				

Mar. 18, 1951	Selma, N. C.	Fairchild M62C Ercoupe 415C	Fatal	350 feet	2 miles.
	Pilots engaged in chasing one another (dogfighting) at altitude from 300 to 400 feet for some 5 to 15 minutes. Prior to the collision the Fairchild was climbing to the north; the Ercoupe turned from a westerly to a southeast heading and descended toward the Fairchild. The left wings collided shearing part of Fairchild wing and entire left wing of Ercoupe. Both aircraft then crashed out of control. Fairchild caught fire after it struck the ground. (Not believed to have been a premeditated dogfight.)				
Feb. 25, 1951	St. Elmo, Ill.	Stinson 108 Aeronca 7AC	Nonfatal	35 feet	On airport.
	Aeronca turned on to final approach slightly ahead of Stinson coming in on final. Neither pilot was apparently sufficiently alert (only aircraft in pattern) and failed to see each other. Stinson overtook and struck the Aeronca. Stinson landed and groundlooped slightly due to a flat tire. Right wing of Aeronca, which was struck, failed, and Aeronca crashed.				
Jan. 12, 1951	San Antonio, Tex.	Vultee BT13A Fairchild M62A	Fatal	1,500 feet	4 miles.
	Pilot in Vultee buzzed the Fairchild and came up under it. Vultee crashed out of control and burned. Pilot landed Fairchild in a field without further damage. (Pilot in Vultee was wearing a parachute.)				
Dec. 10, 1950	Vinita, Okla.	Aeronca TAC Taylorcraft L2M	Nonfatal	25 feet	On airport.
	Pilot in Aeronca was on final approach for landing on runway 29 while Taylorcraft was on final for runway 36. Neither pilot observed the other aircraft until too late to avoid a collision. (This field seldom used by aircraft, wind was 5 miles per hour from 315°.)				
Sept. 30, 1950	Santa Monica, Calif.	Beech D18S Ercoupe 415D	Nonfatal	1,800 feet	2 miles.
	Beech was on a heading of 340° in a climb, while Ercoupe was heading approximately 270°. Ercoupe passed over Beech, and Beech antenna cut through fuselage of Ercoupe, entering left side, continuing through and out the right side. Ercoupe pilot at no time prior to or after collision was aware of Beech and did not know collision occurred. Beech pilots saw Ercoupe after it passed over. Both aircraft then landed without further incident.				
Sept. 4, 1950	Sandwich, Ill.	Luscombe 8A Piper J3C65	Fatal	3,000 feet	3 miles.
	Piper pilot, observing Luscombe engaged in maneuvers ahead, made a 180° turn, then another 180 when he saw the Luscombe to his right. Thereafter he checked while flying straight and level, and Luscombe was coming up behind him. Luscombe was lost from view for a time and was next seen directly below (indications are Luscombe came from right rear in a climb) Piper, with 2 planes colliding. Luscombe spun to the left and crashed. Piper went into a right spin, however, pilot recovered and landed safely in a field.				
July 13, 1950	Houston, Tex.	Boeing A75N1 Piper PA-20	Nonfatal	25 feet	On airport.
	The Piper was ahead and slightly below the Boeing on final approach. Student in the Boeing observed the Piper too late and the propeller cut off the Piper's empennage. Piper nosed into the ground and inverted. Boeing landed without mishap. Both pilots showed lack of alertness in checking for other aircraft in pattern. Piper pilot erred in that he made a straight-in approach (contrary to field regulations), while Boeing followed routine pattern.				

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Date	Location	Aircraft make and model	Injury index	Altitude	Airport proximity
Apr. 30, 1950	Sharon Springs, Kans.	Aeronca 15AC Aeronca 7AC	Fatal	500 feet	5 miles.
	Both aircraft were flying in an easterly direction with 15AC slightly below, ahead, and to the right of 7AC. Both aircraft then made a left turn with 15AC making a considerably steeper turn than the other aircraft. Evidence indicates right wing of 15AC struck 7AC almost severing its tail section. Both aircraft crashed out of control and burned.				
Mar. 4, 1950	Westerly, R. I.	Cessna 140 Cessna 170	do	2,500 feet	3 miles.
	Witnesses observed the 2 aircraft flying in close formation approximately 1 mile offshore. While in a left turn the aircraft collided and Cessna 140 lost a wing, then spun into the ocean. Cessna 170 was observed circling over the scene and apparently crashed soon after, although no one witnessed the crash due to obstructions. An intensive search was made; however, none of the main wreckage or bodies of occupants have been recovered. Small personal articles of occupants, fabric, etc., were later washed ashore.				
Jan. 22, 1950	Miami, Fla.	Cessna 140 Piper PA-11	do	200 feet	¼ mile.
	Piper was making a right-hand pattern in conformance with airport traffic pattern and while turning onto final approach was struck by the Cessna. Both aircraft crashed and burned. Right-hand pattern, when landing to east, had been previously approved and so published and Cessna pilot had been so informed. However, Cessna did not circle field or fly pattern but made a straight-in approach. It appears that instructor in Piper might have seen the Cessna had he been somewhat more vigilant.				
Oct. 16, 1949	Austintown, Ohio.	Piper J3C-65 Piper J3C-65	do	400 feet	½ mile.
	The first plane was on his final approach for landing when struck by the second plane which was turning from base leg onto final. Altitude approximately 400 feet. Both aircraft started to spin and student in the first plane recovered from the spin (at treetop level), effecting a safe landing on airport. Student in second plane failed to recover and spun into the ground. Evidence indicates neither aircraft sustained sufficient damage (prior to ground impact) to render it uncontrollable. Both students exhibited lack of alertness.				
Sept. 5, 1949	Clifton, Ariz.	Taylorcraft BC12D Ercoupe 415CD	do	2,000 feet	1 mile.
	The 2 pilots engaged in a mild dogfight chasing each other for 20 to 25 minutes, following which they appeared to be returning to the airport. The Taylorcraft				

	was in the lead followed closely by the Ercoupe. Taylorcraft pilot then made a steep right (180°) turn and was leveling off when the 2 aircraft collided and crashed.				
Aug. 6, 1949	Cleveland, Ohio	Aeronca 7AC do	Nonfatal	2,500 feet	2 miles.
	Both students were in practice area engaged in advanced maneuvers and each observed the other aircraft too late to avoid a collision. Control was maintained and aircraft landed safely.				
July 20, 1949	Bethany, Okla	Piper J3C–65 do	do	25 feet	¼ mile.
	Neither student observed the other aircraft and collided while on final approach for landing. The 1st plane made a short pattern, overtook the 2d plane from the rear and above. Partial control was maintained with the 2d plane hitting on wheels (washing out gear) and stopped. The 1st plane made a slight turn, landed and spun around. Left turn off downwind leg was directly into low setting sun and sunglare apparently was a contributing factor in student's failure to observe other traffic.				
July 3, 1949	Schwenkville, Pa	Aeronca 7AC Lanier Paraplane	do	1,300 feet	5 miles.
	Both pilots took off from same airport and made flight together and should have been aware of each other's presence. Whether due to a misjudgment while attempting to fly formation or careless observation the Aeronca propeller struck left wheel on the Paraplane. Aeronca pilot was forced to land, as prop broke, and stalled into a small field. The Paraplane sustained a damaged tire and wheel and pilot landed safely. Pilots claim they momentarily lost sight of each other.				
May 29, 1949	Glendale, Ill	Luscombe 8A Aeronca 11BC	Fatal	1,500 feet	Over 5 miles.
	Student in Luscombe states the aircraft were flying level approximately 1,500 feet apart, with Aeronca on the left. He then proceeded to check his maps and was apparently unaware that aircraft no longer maintained adequate separation until impact occurred. Luscombe appears to have come up on Aeronca and aircraft locked momentarily. Aeronca went in out of control and caught fire on impact. Luscombe was landed in a wheat field and nosed over. Accident would appear to be a result of both students' failure to be sufficient alert.				
May 25, 1949	Miami, Okla	Piper J3C–65 do	do	500 feet	Over 5 miles.
	Aircraft collided while in designated practice area, crashed and burned. Evidence indicates aircraft converged on a 30° to 40° angle with 1 to the left and slightly below the other.				
May 3, 1949	Medford, Oreg	Cessna 140 Stinson 108	do	2,000 feet	4 miles.
	Stinson was headed in a general easterly direction while Cessna appeared to be higher (and letting down) going north. Aft end of overtaking Cessna struck left wing of Stinson and shortly thereafter Cessna tail assembly broke loose. Pilot maintained control of Stinson and attempted to land, however, aircraft struck a powerline and crashed into a barn. Cessna dived in and also damaged a small shed.				

Résumé of midair collisions in United States civil flying (exclusive of aerial crop control operations) (Jan. 1, 1948 to Dec. 31, 1957)—Con.

GENERAL AVIATION AND GENERAL AVIATION—Continued

Date	Location	Aircraft make and model	Injury index	Altitude	Airport proximity
Apr. 25, 1949	Indianapolis, Ind	Piper J3C–65 Piper PA–11	Nonfatal	200 feet	¼ mile.
	Aircraft collided while making turn onto final approach and crashed. PA–11 followed J3C on takeoff and was making normal traffic pattern turning from base leg to final. J3C went beyond point where normal turn onto base was made and a 120° turn was then made heading toward point where normal turns are made from base to final and PA–11 was observed too late to avoid colliding. Nose and right wing (at root) of J3C struck left side of PA–11 severing empennage. Instructor landed damaged J3C, however, PA–11 dived into the ground and inverted.				
Mar. 26, 1949	Near Santa Ana, Calif	Ryan ST3KR Aeronca 11BC	Fatal	4,600 feet	Over 5 miles.
	Report indicates the pilot of Ryan was attempting to fly a close formation with Aeronca. While flying level with, and to the right of Aeronca, he attempted to side slip under Aeronca with the probable intention of coming up on the left side. During the maneuver the planes collided and Aeronca was damaged but a landing was made without further incident. Ryan dived to the ground and was demolished.				
Mar. 1, 1949	Culver City, Calif	Cessna 140 Bellanca 14–13	do	200 feet	¼ mile.
	Ground markings plainly indicate right hand traffic pattern. Cessna pilot's first approach was high and he went around making left hand turns as he came in on his second approach. Student flying Bellanca was conforming to right hand pattern and it appears neither pilot observed the other aircraft (only two in the pattern) and they collided on turn into final. Bellanca caught fire following impact.				
Dec. 5, 1948	Canoga Park, Calif	Aeronca 7AC Stinson 108	do	2,500 feet	Over 5 miles.
	Students involved had been dispatched from different airports to practice in the same area. Evidence indicates that neither student observed the other plane in the area in time to avert collision. Pilot of Stinson was in a moderate left turn when the leading edge of the left wing tip struck the right wing tip of Aeronca from behind and severed the tip at the outboard end of the aileron. Aeronca fell out of control and pilot of Stinson landed safely at a nearby airport.				
Nov. 26, 1948	Aurora, Ill	Beechcraft A–35 Aeronca 15AC	Nonfatal	700 feet	¼ mile.
	The Beechcraft with 3 revenue passengers on a charter flight from Cedar Rapids, Iowa, to Kenton, Ohio, received a report of unfavorable weather in east Illinois and decided to land at Aurora to await improvement. Meanwhile the Aeronca with the pilot flying solo from Des Moines, Iowa, to Chicago, Ill., received a report of unfavorable weather at his destination and likewise decided to land at Aurora. Both planes entered the traffic pattern at approximately the same time and had turned onto the downwind leg when a collision occurred, the				

	propeller of the Beechcraft cutting into the left side of the Aeronca empennage. The Beechcraft pilot was able to effect a safe landing on the airport while the Aeronca pilot landed his plane in a plowed field south of the airport, nosing over. While both pilots were at fault in not observing the other, it is felt that the greatest error was on the part of the Beechcraft pilot who flew the crosswind leg abnormally close in, and had the advantage in speed, thus overtaking the slower plane.				
Nov. 7, 1948	Perkinston, Miss.	Piper PA-12 Aeronca 11AC	Fatal	1,500 feet	Over 5 miles.
	Pilots were making a cross-country trip together and apparently had arranged to fly formation or close together on the flight. Statements of witnesses indicate the pilots were having a simulated combat flight when the planes collided approximately 1,500 feet above the ground.				
Oct. 28, 1948	Shelby, Mont.	Aeronca 7AC do	Nonfatal	Unknown	Do.
	Student flying first plane approached too close to second plane and overtook it. The leading edge of the left wing of first plane struck and damaged the right aileron of second plane. Both planes were landed safely.				
Oct. 17, 1948	Near Sacramento, Calif.	do do	Fatal	1,500 feet	Do.
	Pilots and passengers arrived at the airport in a group and rented the aircraft for local pleasure flights. Both aircraft took off together and were observed approximately 15 minutes later locked together at 1,500 feet about 10 miles southwest of the airport. No witnesses were located who saw the collision or observed the aircraft on converging flight paths prior to collision. Indications were that the pilots were attempting flight in close proximity.				
Oct. 7, 1948	East Los Angeles, Calif.	Stinson 108 Cessna 140	Nonfatal	10 feet	On airport.
	Collision appears to be a result of careless lack of vigilance on part of both pilots while approaching for landing. Evidence indicates the slower Cessna came in above and to left of Stinson which made a shorter pattern than the Cessna. Stinson propeller severed tail surface on Cessna which forced Cessna up, and it looped over Stinson and crashed. Stinson climbed, then stalled on left wing and cartwheeled.				
Aug. 29, 1948	Fenton, Mo.	Piper PA-12 Piper J3C-65	Fatal	400 feet	3 miles.
	PA-12 was proceeding northeast at an altitude of approximately 400 feet, and J3C65 was flying southwest at the same altitude. Neither pilot apparently observed the other aircraft until too late to avoid a collision. The left wings collided, and both aircraft crashed out of control. J3C65 burned due to a ruptured fuel tank and landed in a woods; PA-12 crashed in the river. Collision occurred over a well-populated beach, and it is possible pilots may have diverted their attention to people on the ground.				
Aug. 25, 1948	Annapolis, Md.	do do	do	550 feet	2 miles.
	Instructor and student in first plane were flying at about 500 to 600 feet just outside of the airport traffic pattern and pilot with a passenger apparently was about to enter the traffic pattern to land. Visibility was about 3 to 4 miles, due to smoke and haze. Evidently neither pilot observed the other plane and they collided with their right wings. Both planes continued on for about 600 feet and then crashed. First plane caught fire after impact with the ground.				

Résumé of midair collisions in United States civil flying (exclusive of aerial crop control operations) (Jan. 1, 1948 to Dec. 31, 1957)—Con.

GENERAL AVIATION AND GENERAL AVIATION—Continued

Date	Location	Aircraft make and model	Injury index	Altitude	Airport proximity
Aug. 25, 1948	St. Louis, Mo.	Cessna 140 Cessna 120	Nonfatal	125 feet	On airport.
	Student in 140 made a short approach and overtook and collided with 120 which was making a normal approach. Impact occurred at an altitude of about 100 feet. The left wing of 120 was damaged extensively and it crashed. Pilot of 140 completed his landing.				
July 25, 1948	Fernandina, Fla.	Piper J3C-65 do	do	1,000 feet	Over 5 miles.
	First plane and second plane collided in midair while flying in close formation by prior arrangements between the pilots. First plane was able to get to his base 6 miles away. Second plane made a crash landing in the vicinity of the scene of the collision.				
July 17, 1948	Orange, Va.	Luscombe 8A Piper J3C	do	100 feet	¼ mile.
	Student in Luscombe made a long final approach. Student in Piper was shooting landings and made a normal approach. Neither saw the other plane during the approach. At an altitude of about 100 feet, as Piper was completing the turn onto final leg, the planes collided. Luscombe fell off in a left spin and crashed. Pilot of Piper landed safely.				
Do.	Mount Pleasant, Mich.	Cessna 140 do	do	Unknown	Over 5 miles.
	Instructor with a student in 1st plane was flying rather close formation with 2d plane and turned in toward that plane, striking its left wingtip with his elevator and horizontal stabilizer.				
July 11, 1948	Rochester, Ind.	do do	do	5 feet	On airport.
	Advanced students were operating from a sod field. 1st plane taking off northeast collided with 2d plane taking off toward the north.				
June 27, 1948	Rapid City, S. Dak.	Ercoupe 415C do	do	150 feet	½ mile.
	During an air race the 2 planes collided while rounding a pylon. Both aircraft made immediate landing in an adjacent field without further damage or personal injury.				
June 8, 1948	Riverton, Ill.	Piper PA-11 Piper J3C-65	Fatal	500 feet	4 miles.
	Evidence indicates that the planes collided while the pilots were dogfighting at an altitude of about 500 feet in a local practice area. PA-11 burned following impact with the ground.				
May 5, 1948	Detroit, Mich.	Vultee BT13 Piper J3C-65	do	750 feet	2 miles.
	Both aircraft were approaching for landing turning on downwind leg when the collision occurred. Vultee overtook Piper from above and to the left. Piper				

	was cut by the prop of Vultee and disintegrated with the front end dropping free and burned on impact. Vultee was put into a glide (with part of other aircraft caught in its gear), collided with trees, and crashed inverted.				
May 1, 1948	Hayward, Calif.	Piper PA-12 Taylorcraft BC12D	do.	400 feet	On airport.
	The aircraft involved were simultaneously using contiguous lanes of a 3-lane runway of a very busy, uncontrolled airport. Pilot of Piper made an initial takeoff from the centerlane, while pilot of Taylorcraft, which was the slower plane, made a touch-and-go takeoff from the left lane. Evidently neither pilot observed the other plane and Piper overtook and collided with Taylorcraft from which the left wing was shorn, at an altitude of about 400 feet, near the airport boundary. Taylorcraft fell out of control on the airport and pilot of Piper landed on an adjoining field.				
Apr. 20, 1948	San Antonio, Tex.	Luscombe 8E Cessna 120	Nonfatal	50 feet	Do.
	The student in Cessna was making prescribed right hand approach and had been cleared to land. Pilot in Luscombe made a left hand approach and turned on final against "red" lights from the tower. The left wing of Cessna came in contact with tail surface of Luscombe. However, both pilots maintained control and landed safely.				
Apr. 17, 1948	Mulberry, Ind.	Piper J3C-65 do.	do.	2,600 feet	3 miles.
	Students were accompanying each other on a cross-country flight in a 15 mile per hour gusty wind. They endeavored to approach too close to one another and the planes collided at an altitude of about 2,600 feet. Both pilots maintained sufficient control to crash land safely.				
Apr. 16, 1948	Fort Worth, Tex.	Stinson 108 Piper J3C-65	Fatal	200 feet	¼ mile.
	Pilot in Stinson failed to conform to local left hand traffic and was making a right hand pattern (this pattern had been used at ore time but was changed to "left" several months prior to accident and notices posted to that effect). Pilot was making a left hand pattern in Piper and the 2 aircraft were on final approach when the collision occurred. Right wing of Piper hit left side of Stinson; Piper spun in and crashed inverted while Stinson was safely landed. It appears neither pilot observed the other aircraft prior to collision with blinding glare of setting sun being a contributing factor.				
Apr. 4, 1948	Circleville, Ohio	Taylorcraft BC12D Aeronca 11BC	do.	1,250 feet	1 mile.
	Available evidence indicates neither pilot exercised due vigilance and failing to observe the other aircraft, collided. Aeronca appeared to have been in a slight climbing attitude south while Taylorcraft converged upon it at approximately a 45° angle. It is believed pilot in Taylorcraft may have had her vision restricted in sunglare. Both wings were torn off Taylorcraft and it fell free. Aeronca, with right wing of Taylorcraft imbedded in its fuselage, crashed on railroad tracks and burned. However, fire had started in the air following the collision.				

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GENERAL AVIATION AND GENERAL AVIATION—Continued

Date	Location	Aircraft make and model	Injury index	Altitude	Airport proximity
Apr. 4, 1948	Norrisville, Pa	Aeronca 7AC do	Fatal	2,000 feet	Over 5 miles.
	Pilot in first plane was in level flight on his return to the airport when pilot in second plane (who had been engaged in acrobatics) pulled up from below in a climbing right turn and the left wing hit the right wing of first plane. Second plane spun in out of control and crashed. However, pilot in first plane succeeded in landing his disabled craft in a nearby field. The pilot in first plane did not see the other aircraft until just prior to the moment of collision when it appeared under his right wing (as though it were in a loop). No parachutes were worn by any of the occupants in the involved aircraft.				
Apr. 2, 1948	De Land, Fla	Aeronca 7AC Fairchild M62A	do	1,000 feet	2 miles.
	Both aircraft were observed while circling in the immediate vicinity of each other, and approximately at the same altitude, for several minutes. At the time of impact Fairchild was flying level toward late afternoon sun and Aeronca was in a steep right turn. Fairchild squarely struck the left wing of Aeronca which was damaged extensively and fell out of control. Fairchild was crash-landed inside the airport boundary. Evidence indicates that both pilots had been engaging in unprearranged "formation flying."				
Mar. 30, 1948	Newark, Ohio	Aeronca 7AC Taylorcraft BC12	do	60 feet	¼ mile.
	Pilot of Taylorcraft was on the final leg of a normal landing approach. Student in Aeronca was making a 360° or 720° overhead approach and let down directly in front of Taylorcraft and the planes collided at an altitude of about 60 feet. Aeronca crashed. Pilot of Taylorcraft landed without further damage. Prior to this accident both approaches had been approved by the operator.				
Feb. 9, 1948	Lonsdale, Ark	Swift GC1B Stinson 108	Nonfatal	2,500 feet	Over 5 miles.
	Aircraft were part of a formation flight with Stinson leading. Pilot in Swift pulled up to signal the lead pilot and while checking a map allowed Swift to close in and its propeller damaged Stinson. Stinson was apparently landed without additional damage. However, pilot in Swift making a forced landing following damage to propeller in the collision, overshot the emergency field, collided with a tree and nosed over.				
Jan. 17, 1948	Santa Rosa, Calif	Taylorcraft DCO-65 Cessna 140	Fatal	600 feet	¼ mile.
	Pilot in Taylorcraft made a straight-in approach landing against prevailing traffic and apparently observing other aircraft coming in from the opposite direction, pulled up into a sharp turn, then proceeded to climb for another approach. Student in Cessna (having made a touch-and-go landing) was in position to enter traffic pattern for a landing when struck by Taylorcraft which had come up from				

	below and to the left of him. The aircraft locked and crashed, bursting into flames on impact. Student in Cessna had the sun somewhat low from his left which would have limited his vision in that direction so that Taylorcraft would not be readily observed prior to collision.				
Jan. 10, 1948	St. Paul, Minn.	Stinson 108 Luscombe 8A	do	10 feet	On airport.
	Pilot in Stinson was making a long final approach while student in Luscombe who observed the other aircraft as he turned into final approach, but believed it to be outside the traffic pattern, came in slightly below. It appears neither pilot observed the other aircraft on the final approach and collided at about the level-off point with Stinson being above Luscombe.				

GENERAL AVIATION AND MILITARY

Nov. 14, 1957	Sioux City, S. Dak.	Beech G-35 ANG F-84	Fatal	2,600 feet	3 miles from airport.
	Beech had just taken off from Rickenbacker Airport. F-84 was making a 360° turn to get in position to enter traffic pattern for Sioux City Airport. When rolling out of the turn, pilot saw the Beech but was unable to avoid it and struck it with its left wing. Beech crashed and burned.				
Oct. 17, 1957	Barrington, Ill.	Piper PA-23 Air Force F-86	Nonfatal	2,000 feet	10 miles from airport.
	PA-23 on a cross-country flight at night. While in a slight descent at 2,000 feet was struck at the top of the tail section by F-86 which was in level flight. Neither aircraft was equipped with anticollision lights.				
Sept. 9, 1957	Fullerton, Calif.	Piper PA-22 Navy S-2F	do	2,000 feet	5 miles from airport.
	Piper was on a simulated instrument flight and was making a normal letdown when flight instructor observed the Navy aircraft 30° to the right of the Piper. Piper was put into a sharp diving turn to the right at the same instant Navy made a sharp diving turn to the left. Navy aircraft struck Piper on left wing struts. Both aircraft landed safely.				
May 29, 1957	Baltimore, Md.	Cessna 182 USAF C-45	do	2,800 to 3,000 feet	2 miles from airport.
	Both aircraft had been cleared for IFR practice approaches to remain VFR at all times. Cessna was inbound in a heading of 194°. C-45 was inbound on a heading of 289°. Both aircraft had just passed the radio range station. Propeller on right engine of C-45 struck the left elevator of the Cessna. The C-45 observed the Cessna just prior to collision.				
Oct. 24, 1956	Midland, Tex.	Cessna 170 AF Jet T-33	Fatal	1,000 feet	Unknown.
	Witnesses observed the aircraft over the edge of the city, both headed in an easterly direction. They reported the Cessna was flying straight and level and the jet was in a shallow climb when it overtook the Cessna from below. Witnesses stated the T-33 seemed to bank to the right just before the collision. Parts of the Cessna were observed flying through the air after the collision. The jet crashed in a flat spin.				

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GENERAL AVIATION AND MILITARY—Continued

Date	Location	Aircraft make and model	Injury index	Altitude	Airport proximity
June 28, 1955	Albuquerque, N. Mex.	Beech B50 USAF F86D	Nonfatal	9,500 feet	20 miles.
	USAF jet intercept plane flew into civilian Beech B–50 while trying to make a visual night identification. The Beech remained under control and continued on to the airport and landed safely. The jet landed without incident. The Beech was found to have a tear through the right flap and into the wing for about 2 feet. Embedded in the hole in the wing was a piece of dural metal from the jet.				
June 2, 1955	Park Ridge, Ill.	Beech F–35 USAF F86D	do	Unknown	½ mile.
	The Beech had been cleared for and was making a simulated ILS approach. As the pilot reported his position over the middle marker he was requested by the control tower to pull out to the right. Instead he pulled up and the Beech propeller made contact with the underside of the fuselage of the F86D which was also making an approach to the field. Both aircraft received substantial damage but were landed without injury to either pilot.				
Sept. 11, 1954	Arlington, Tex.	Cessna 120 North American T–28.	Fatal	500 to 650 feet	2 miles.
	Shortly after takeoff from Grand Prairie Airport, Cessna, on cross-country flight was involved in a midair collision with the military plane. The military plane had taken off from Hensley Field, approximately 2½ to 3 miles east of Grand Prairie Airport. The traffic pattern of Grand Prairie is 800 feet above the surface; the elevation of the Grand Prairie is 500 feet. The traffic pattern of Hensley states that the altitude will be 1,500 feet mean sea level.				
Feb. 3, 1953	Midland, Tex.	Cessna 195 North American T–28.	Nonfatal	250 feet	On airport.
	Civilian aircraft, using a left hand traffic pattern, were to be given right-of-way over military aircraft (which were using a right hand pattern) and traffic was controlled from a mobile unit. The Cessna had been cleared for landing following a military aircraft, and as he was making his approach a 3-plane formation entered the traffic pattern. Cessna pilot was again cleared to land, however, it appears the military pilot failed to go around when directed and overtook the Cessna damaging the left wing tip and aileron. Both pilots maintained control of aircraft and landed safely.				
Jan. 2, 1953	Belmar, N. J.	Luscombe 8A Cessna L19	do	5 feet	On airport.
	Airport did not have a control tower and was used by military and civilian aircraft. The military pilot did not see the Luscombe which blended in somewhat with the white (snow) background, just about sunset. Luscombe was being leveled off when struck from above and it dropped in hard and ground-looped. Military pilot pulled up and circled for another approach.				

Dec. 20, 1952	Massapequa, N. Y.	Cessna 140 B-25	do	3,000 feet	2 miles.
	The military aircraft crew was on a simulated instrument flight and was proceeding to the range station. The Cessna pilot was also flying the same leg of the range and was overtaken by the B-25. Observer in the B-25 did not see the Cessna prior to the collision. Both of the Cessna wings were cut by the B-25 propellers; however, pilot maintained control and landed without further incident.				
Oct. 22, 1952	Deer Park, N. Y.	Aeronca 11AC Curtiss C-46	Fatal	2,000 feet	1 mile.
	The 2 aircraft were on a converging course with the Aeronca approaching from from the left of the C-46, out of the sun. Pilots in the C-46 observed the Aeronca in the last instant and pulled up sharply in an attempt to avoid a collision. No apparent evasive action was made by the student in the Aeronca. The right propeller of the C-46 struck the Aeronca damaging the right wing and empennage and the Aeronca crashed out of control. The C-46 was safely landed and had received very minor damage.				
Feb. 22, 1952	Pt. McKenzie, Alaska	Piper J3C-65 Jet F94B	do	1,200 feet	Over 5 miles.
	The military plane overtook and collided with the civil aircraft during landing approach. Sun was in military pilot's eyes.				
Nov. 29, 1951	Boise, Idaho	Luscombe 8A USAF B-29	Nonfatal	4,000 feet	4 miles.
	The B-29 was making a simulated instrument approach on a heading of 1210, while Luscombe was headed approximately 85° on return flight to airport, during twilight hours. Neither pilot nor aircraft occupants observed the other aircraft until the instant prior to collision. Luscombe was landed in a field and B-29 was flown to home base.				
Nov. 12, 1951	Stanton, Calif.	Cessna 140 Grumman F6F5	Fatal	1,500 feet	4 miles.
	The Cessna was headed on a southeasterly heading and the Navy aircraft in a northwesterly banked attitude, at the same altitude, when the left wings on each came in contact and the 2 aircraft crashed out of control. Navy aircraft burned following impact. There was no visibility restriction. Appears Navy aircraft was in a slight left bank.				
Aug. 5, 1951	Harrison, N. Y.	Cessna 170 Beechcraft SNB-2	Nonfatal	1,000 feet	1 mile.
	Pilot in Beechcraft was entering on to base leg while the Cessna, which had been cleared No. 2 to follow the Beechcraft, also made an approach. Cessna came in to the right of and below the Beechcraft, and neither the student nor instructor saw the Beechcraft (passenger saw it just prior to collision). Engine separated from Cessna, however, student maintained control and landed in a wooded area. Beechcraft pilot landed on runway with right gear damaged.				
Sept. 10, 1949	Wyandotte, Mich.	Aeronca 058-B Douglas B-26	do	2,400 feet	2 miles.
	Army aircraft overtook Aeronca while in level flight. Right wing of B-26 struck the Aeronca, knocking off the right gear and motor mounts broke. Pilot regained control of Aeronca and landed in a field while B-26 returned to base.				

Résumé of midair collisions in United States civil flying (exclusive of aerial crop control operations) (Jan. 1, 1948 to Dec. 31, 1957)—Con.

GENERAL AVIATION AND MILITARY—Continued

Date	Location	Aircraft make and model	Injury index	Altitude	Airport proximity
Mar. 5, 1949	Long Beach, Calif.	Aeronca 7AC North American AT-6	Nonfatal	1,800 feet	3 miles.
	Aircraft were on converging patns with AT-6 descending from the higher altitude and turning. AT-6 pilot observed the Aeronca a moment prior to collision and attempted to pull up. Tail of AT-6 hit engine section of Aeronca and right wings touched. Control was maintained with AT-6 landing on Long Beach Airport while Aeronca made a dead-stick landing on Vultee Airport with no additional damage.				
Nov. 7, 1948	Columbus, Ohio	Vultee BT-13 N. A. SNJ	do	1,200 feet	4 miles.
	Pilot of BT-13 states he had completed several acrobatic maneuvers when he observed the Navy plane coming toward him. He then made several maneuvers to get away from the Navy plane. Navy pilot states he was in normal flight when he observed the civilian plane. The Navy pilot then maneuvered to get away from BT-13. The planes collided, but each landed at their respective bases without further incident.				
Sept. 9, 1948	Anchorage, Alaska	Aeronca 11AC Navy PB4Y2	do	800 feet	½ mile.
	Navy PB4Y2 on approach to Elmendorf Field collided with Aeronca on approach to Merrill Field. Vertical fin of Navy plane damaged right wing of Aeronca. Both planes landed without further incident or injury. Report indicates Navy cut across Merrill Field traffic pattern and overtook the Aeronca. Crew of Navy plane saw Aeronca too late to avoid collision.				
Aug. 5, 1948	Hollywood, Fla.	Boeing N2S5 Douglas R4D	Fatal	3,400 feet	Over 5 miles.
	Instructor and student in N2S5 were returning to their base (about 10 miles distance), within an airway at about 3,400 feet, when they were overtaken and struck by Navy R4D (DC-3) which was destined to land at a Navy airport that is adjacent to the instructor's base. Both planes fell out of control and the Navy plane burned upon impact. Instructor and student abandoned their plane and descended safely by parachute.				

EXHIBIT 2

RADIO TECHNICAL COMMISSION FOR AERONAUTICS PERFORMANCE STANDARDS FOR DISTANCE MEASURING EQUIPMENT

RADIO TECHNICAL COMMISSION FOR AERONAUTICS,
Washington, D. C., July 17, 1958.

To: All members of SC58–D.
Subject: Airborne equipment employing pulse techniques.

Enclosed for your consideration and record is a copy of Paper 140–58/SC58–248, third draft, Minimum Performance Standards—Airborne TACAN Distance Measuring Equipment.

It was agreed at the June 9 meeting that upon receipt of the information requested from the CAA in our letter to them of June 10, 1958, Paper 120–58/SC58–244, the standards on interrogator peak power would be revised. To date no formal reply has been received from the CAA. However, the Secretary has learned that they have the Federal Telecommunications Laboratories' proposal under consideration, and that it may be some time before a final decision on it is reached. In light of this information, it is considered advisable to proceed with the completion of the TACAN standards without waiting for CAA's decision. The standards on interrogator peak power (par. 2.7), therefore, have been revised to provide for a 4-db margin in the air-to-ground path in excess of the theoretical minimum power required when operating with ground TACAN and VORTAC stations which use a standard TACAN antenna for the reception of DMET interrogator signals. A note has been added to this standard explaining that airborne interrogator power output requirements may be reduced if and when CAA modifies the ground stations by adding a separate dipole antenna for the reception of DMET interrogation signals.

Several other standards of the DMET paper have been revised as agreed upon at the June 9 meeting including those on receiver sensitivity, paragraph 2.9. The latter were revised to reflect the recommendations of Mr. Poritzky which were reviewed and accepted by the committee at this meeting (see Paper 101–58/SC58–240). Through an oversight, the agreement to change paragraph 2.9, receiver sensitivity, was not specifically recorded in the minutes of the meeting.

Paper 140–58/SC58–248, third draft, Minimum Performance Standards—Airborne TACAN Distance Measuring Equipment, will be submitted to SC58 (main committee) for approval at its next meeting. If you have any comments on this paper, please forward them to the undersigned by August 1, 1958. If no comments are received, your approval of the paper will be assumed.

G. F. SCHILLINGER,
Secretary, SC58–D.

RADIO TECHNICAL COMMISSION FOR AERONAUTICS,
Washington, D. C., July 17, 1958.

Subject: Minimum performance requirements for airborne electronic equipment for the transition period common system.
To: All members of SC58.

Attached for your consideration and record is a copy of Paper 140–58/SC58–248, third draft, Minimum Performance Standards—Airborne TACAN Distance Measuring Equipment. Copies of this paper have been sent to the membership of SC58–D for final comment.

Approval of the attached paper will be considered at the next meeting of SC58. Should adverse comments on this paper be received from the membership of the subcommittee, SC58–D, they will be discussed and the associated problems resolved at this meeting.

G. F. SCHILLINGER,
Secretary, SC58.

MINIMUM PERFORMANCE STANDARDS, AIRBORNE TACAN DISTANCE MEASURING EQUIPMENT

THIRD DRAFT—REPORT OF SPECIAL COMMITTEE 58

Paper 140-58/SC58-248, July 16, 1958, prepared by RTCA SC-58

1.0 GENERAL STANDARDS.

1.1 *Rating of components.*—The equipment shall not incorporate any component of such rating that, when the equipment is operated throughout the range of the specified environmental tests, the rating established by the manufacturer of the component is exceeded. For electron tubes and transistors, either the tube or transistor manufacturer's continuous commercial service rating, his established pulse rating, or his approved rating as applied to the particular application, whichever is appropriate, shall apply, except for the heaters and filaments. The voltage applied to the heaters and filaments of electron tubes shall be within 5 percent of the manufacturer's rating, or at a value approved by the tube manufacturer for the particular service, when the equipment is operated under standard operating conditions. When the heaters and filaments are connected in series, the 5 percent tolerance shall apply to the sum of their voltage ratings.

1.2 *Operation of controls.*—The operation of controls intended for use during flight in all possible position combinations and sequences shall not result in a condition whose presence or continuation would be detrimental to the reliability of the equipment.

1.3 *Accessibility of controls.*—Controls which are not normally adjusted in flight shall not be readily accessible to flight personnel.

1.4 *Adjustment of pulse repetition frequency.*—A control shall be provided for the adjustment of pulse repetition frequency.

1.5 *Effects of test*—The design of the equipment shall be such that the application of the specified tests produces no discernible condition which would be detrimental to the reliability of the equipment manufactured in accordance with such design.

2.0 MINIMUM PERFORMANCE STANDARDS UNDER STANDARD TEST CONDITIONS.

The test procedures applicable to a determination of the performance of airborne TACAN distance measuring equipment operating within the band 960–1215 mc. under standard test conditions are set forth in appendix A of this report.

2.1 *Accuracy.*—At distances from the transponder from zero to that for which the equipment is designed, the total error of the airborne equipment, as presented to the pilot, shall be such that when combined by root sum square with a 0.1 nautical mile error attributed to the ground facility, the total error does not exceed:

±0.5 nautical mile or 3 percent of distance, whichever is greater, for equipment intended for installation in aircraft which operate at altitudes not exceeding 15,000 feet.

±0.5 nautical mile or 1 percent of distance, whichever is greater, for equipment intended for installation in aircraft which will be operated at altitudes above 15,000 feet.

This accuracy shall be met under all combinations of the following conditions:

(*a*) Variation in ambient temperature throughout the range for which the equipment is designed.

NOTE.—Three temperature ranges are given in Paper 100-54/DO-60, Environmental Test Procedures—Airborne Radio Equipment. They are −55° C. to +55° C., −40° C. to +55° C., and −10° C. to +40° C.

(*b*) Variation of ±10 percent in primary power voltage.

(*c*) A variation in fruit level from zero to 6,000 random pulses per second in addition to the random pulse pairs of a single TACAN station.

(*d*) Variation in input signal level from −10 dbm to the weakest signal on which the equipment will track.

(*e*) Variation in pulse repetition frequency throughout the range for which the equipment is designed.

NOTE.—It is not necessary that equipment be subjected to all combinations of the above variable conditions simultaneously to determine compliance with this standard. The overall error may be determined by adding algebraically the errors due to the separate variables.

2.2 *Interrogator pulse spectrum.*—At least 95 percent of the energy in each pulse shall be within the 0.5 mc. band centered on the channel frequency.

2.3 *Interrogator pulse characteristics.*—

a. Interrogator pulse rise time: The time required for the pulse to rise from 10 percent to 90 percent of its maximum voltage amplitude shall be 2.5±0.5 microseconds.

b. Interrogator pulse fall time: The time required for the pulse to fall from 90 percent to 10 percent of its maximum voltage amplitude shall be 2.5±1.0 microseconds.

c. Interrogator pulse duration: The time between the points on the leading and trailing edges of the pulse which are 50 percent of the maximum voltage amplitude of the pulse, shall be 3.5±0.5 microseconds.

d. Interrogator pulse top: Between the point on the leading edge of the pulse which is 95 percent of maximum amplitude and the point on the trailing edge of the pulse which is 95 percent of the maximum amplitude, the instantaneous amplitude of the pulse shall not fall below 95 percent of the maximum voltage amplitude of the pulse.

2.4 *Interrogator pulse coding.*—The interrogation signal shall comprise a pair of pulses having a spacing of 12±0.5 microseconds between the points on the leading edges of the pulses which are 50 percent of the maximum pulse amplitude.

2.5 *Interrogator pulse repetition rate.*—

(a) The interrogator average p. r. f. (pulse repetition frequency) shall not exceed 30 pairs of pulses per second, assuming the interrogator is search-5 percent of the time at its maximum search p. r. f. and tracking 95 percent of the time.

(b) During search, the interrogation p. r. f. shall not exceed 150 pairs of pulses per second. Additionally, after 15,000 pairs of pulses have been transmitted during a searching period and the search has been unsuccessful, the p. r. f. shall not exceed 60 pairs of pulses per second.

(c) The variation in time between successive pairs of interrogation pulses shall be at least 1 percent.

2.6 *Interrogator frequency stability.*—The radiofrequency of the interrogator signal shall be within ±100 kc. of the assigned channel frequency.

2.7 *Interrogator peak power.*—

(a) The output power of the interrogator at the peak of the second transmitter pulse shall be as follows:

(1) At least 1,000 watts for equipment intended for installation in aircraft which operate above 15,000 feet.

(2) At least 250 watts for equipment intended for installation in aircraft which operate below 15,000 feet.

(b) The output power of the interrogator at the peak of the first transmitter pulse shall be within 1 db of the peak power of the second pulse.

NOTE 1.—In establishing the above standards, it was assumed that the transmission line loss is 3 db and that a matched resonant quarterwave half dipole antenna working with a large, flat, highly conductive ground plane is employed. In the event that these assumed conditions do not apply, the minimum output power shall be sufficient to provide the equivalent radiated field strength.

NOTE 2.—The above standards are predicated on ground VORTAC and TACAN stations being equipped with a standard TACAN antenna. The Civil Aeronautics Administration is considering a plan to use a separate ground station dipole antenna for the reception of DMET interrogation signals. This antenna has a 10 db gain advantage over that of the standard TACAN antenna. If at such a time that VORTAC and TACAN ground stations are modified to use this antenna, the airborne interrogator power output at the peak of the second transmitter pulse may be reduced to the following levels:

(1) At least 100 watts for equipment intended for installation in aircraft which operate above 15,000 feet.

(2) At least 25 watts for equipment intended for installation in aircraft which operate below 15,000 feet.

2.8 *Spurious radiation.*—

(a) During the period of plus emission the peak power in spurious radiations within the bands −1 to −2 mc. and +1 to +2 mc. from the assigned channel frequency shall be at least 25 db below the peak power of the main pulse and the peak power of spurious radiations more than 2 mc. from the

assigned channel frequency shall be at least 43+10 log (power in watts) db below the peak power of the main pulse.

(b) The emission of radiofrequency energy from the receiver over the frequency range of 90 kc. to 1,500 mc. shall not exceed the following:

(1) Between each cable terminal and ground 200 uv.

(2) Across the test antenna or, in cases where the receiver is designed for a specific source impedance, across a resistive load equal to the source impedance, for which the equipment is designed, 400 micromicrowatts.

NOTE.—It is recognized that radiofrequency emissions having a level considerably less than the maximum permitted by the above standard are capable of interfering with the operation of other electronic equipment within and external to an aircraft. It is also recognized that methods of reducing the level of emissions of radiofrequency energy to much lower values are known. However, at the present state of the art, large and expensive filters are often required in addition to the exercise of care in the mechanical and electrical design of the equipment. The end result is often a compromise between what is desired and cost. In view of the above, the emission standards were set at a level which can be met by exercise of reasonable care in design and yet effect a reduction in the present overall interference problem. Lower emission levels are desirable, and it is therefore recommended that equipment manufacturers make a determined effort to reduce the level of emissions from electronic equipment to the lowest practicable value below that specified above.

2.9 *Receiver sensitivity.*—

(*a*) For equipment intended for installation in aircraft which operate at altitudes above 15,000 feet, the input signal level at the equipment signal input terminals required to effect a successful end of search 9 out of 10 searching cycles shall not exceed —76 dbm when the input signal is a TACAN test signal and —73 dbm when there are 6,000 random pulses present in addition to the TACAN test signal. The input signal level required to maintain tracking shall not exceed —79 dbm when the input signal is a TACAN test signal and —76 dbm when 6,000 random pulses are present in addition to the TACAN test signal.

(*b*) For equipment intended for installation in aircraft which operate at altitudes below 15,000 feet, the input signal level at the equipment signal terminals required to effect a successful end of search 9 out of 10 searching cycles shall not exceed —72 dbm when the input signal is a TACAN Test Signal and —69 dbm when there are 6,000 random pulses present in addition to the TACAN test signal. The input signal level required to maintain tracking shall not exceed —75 dbm when the input signal is a TACAN test signal and —72 dbm when 6,000 random pulses are present in addition to the TACAN test signal.

2.10 *Receiver selectivity.*—

(*a*) The level of an input signal required to produce a successful end of search 9 out of 10 searching cycles shall not vary more than 6 db over the input signal frequency range:

From at least the assigned channel frequency minus 200 kc. minus the maximum positive departure of center response frequency from the assignel channel frequency over the temperature range for which the equipment is designed.

To at least the assigned channel frequency plus 200 kc. plus the maximum negative departure of center response from the assigned channel frequency over the temperature range for which the equipment is designed.

(*b*) The level of an input signal required to produce an average of not more than 1 successful end of search out of 10 searching cycles and that one to continue in track for not more than 5 seconds shall be at least 30 db greater than that required to produce an average of at least nine successful ends of search out of ten searching cycles at the frequency of maximum response:

At an input signal frequency of the assigned channel frequency, plus 1.0 mc., minus 200 kc., minus the maximum positive departure of center response frequency from the assigned channel frequency occuring over the temperature range for which the equipment is designed.

And at an input signal frequency of the assigned channel frequency, minus 1.0 mc., plus 200 kc., plus the maximum negative departure of

center response frequency occurring over the temperature range for which the equipment is designed.

2.11 *Receiver decoder selectivity.*—Over the input signal level range from —60 dbm to —80 dbm, the receiver shall—

(*a*) Satisfactorily indicate distance when the spacing of the received pulses is varied over the range of 11.5 to 12.5 microseconds.

(*b*) Result in an average of not more than 1 successful end of search out of 10 searching cycles and that one to continue in track for not more than 5 seconds when the spacing of the received pulses is less than 11 microseconds and more than 13 microseconds.

2.12 *Searching speed.*—The searching speed shall be at least 10 miles per second.

2.13 *Amplitude selectivity.*—In the presence of two TACAN test signals, both at channel frequency, the receiver shall respond to the signal of greater level whenever the difference in level of the 2 signals, each modulated at 43 per cent, is 20 db or more.

2.14 *Spurious response and intermodulation.*—

(*a*) Over the input signal frequency range of 90 kc. to 10,000 mc., excluding the frequencies within 3 mc., of the assigned channel frequency to which the equipment is tuned, a cw signal having a level of —30 dbm shall not adversely affect the sensitivity of the receiver.

(*b*) Over the input signal frequency range of 960 mc. to 1,215 mc., excluding the frequencies within 1 mc. of the assigned channel frequency to which the equipment is tuned, the equipment shall not respond to nor be adversely affected by a TACAN test signal having a level 50 db above that on-channel signal level which results in a successful end of search, 9 out of 10 searching cycles. This standard shall be met with and without a TACAN test signal at channel frequency. When the TACAN test signal at channel frequency is present, the range in level shall be from the lowest which produces a successful end of search 9 out of 10 searching cycles to —30 dbm.

2.15 *Alarm signal.*—The equipment shall be of such design that when it is not tracking a TACAN signal, this condition shall be obvious to the flight crew.

3.0 MINIMUM PERFORMANCE STANDARDS UNDER ENVIRONMENTAL TEST CONDITIONS.

Unless otherwise specified, the test procedures applicable to a determination of the performance of airborne TACAN distance measuring equipment under environmental test conditions are set forth in RTCA paper 100–54/DO–60, Environmental Test Procedures—Airborne Radio Equipment, April 13, 1954. The applicable electrical test procedures are set forth in appendix A to this report.

3.1 *Low temperature and high temperature test.*—When the equipment is subjected to the low temperature and to the high temperature test, the peak power output and the receiver sensitivity standards of paragraphs 2.7 and 2.9, respectively, shall be met.

3.2 *Temperature variation test.*—When the temperature of the air to which the equipment is subjected is varied over the range for which the equipment is designed, the standards of section 2 shall be met.

3.3 *Altitude test.*—When the equipment is subjected to the altitude test, the requirements of section 2 shall be met.

3.4 *Humidity test.*—After subjection to humidity and—

a. Within 15 minutes from the time primary power is applied, the peak pulse power output shall be within 3 db and the receiver sensitivity within 3 db of that obtained under standard test conditions.

b. Within 4 hours from the time primary power is applied, the peak pulse power output shall be within 2 db and the receiver sensitivity within 2 db of that obtained under standard conditions.

3.5 *Vibration test.*—When the equipment is subjected to the vibration test, the standards of section 2 shall be met.

3.6 *Susceptibility test.*—When the equipment is subjected to the 1,000 μ test and the ripple test, the standards of section 2 shall be met.

3.7 *Shock test.*—

a. Following the application of 15G shocks, the standards of section 2 shall be met.

b. Following the application of 30G shocks, the equipment under test shall have remained in its mounting, and no parts of the equipment on its mounting shall have become attached and free of the equipment. Paragraph 1.5 does not apply to this test.[1]

[1] The application of these tests may result in damage to the equipment under test. Therefore, they may be conducted after the other tests are completed.

3.8 *Low-voltage test.*—

a. When the primary power voltage(s) is 80 percent of standard test voltages, the equipment shall operate electrically and mechanically.

b. The gradual reduction of the primary power voltage(s) from 80 percent to 50 percent of standard test voltage(s) shall produce no condition detrimental to the reliability of the equipment.

c. The gradual reduction of the primary power voltage(s) from 50 percent to 0 percent of standard test voltage(s) shall produce no evidence, external to the equipment, of the presence of fire or smoke. Paragraph 1.5 does not apply to this test.[1]

APPENDIX

TEST PROCEDURES, AIRBORNE TACAN DISTANCE-MEASURING EQUIPMENT

The following definitions of terms and conditions of test are applicable to the receiving equipment tests specified herein:

A. Unless otherwise specified, all tests should be conducted with the power input voltage adjusted to design voltage ±2 percent. The input voltage shall be measured at the equipment input terminals.

NOTE.—Design voltages in use as of the date of this report are 13.75 volts d.c., 27.5 volts d.c., and 115 volts ac.

B. 1. In the case of equipment designed for operation from an a. c. power source of essentially constant frequency (e. g., 400 c. p. s.), the input frequency shall be adjusted to design frequency ±2 percent.

2. In the case of equipment designed for operation from an a. c. power source of variable frequency (e. g., 300 to 1,000 c. p. s.), unless otherwise specified, tests shall be conducted with the input frequency adjusted to within 5 percent of a selected frequency within the range for which the equipment is designed.

C. Adjustment of equipment: The circuits of the equipment under test shall be properly alined and otherwise adjusted in accordance with the manufacturer's recommended practices prior to the application of the specified tests.

D. Test instrument precautions: Due precautions shall be taken during the conduct of the tests to prevent the introduction of errors resulting from the improper connection of headphones, voltmeters, oscilloscopes, and other test instruments across the input and output impedances of the equipment under test.

E. Ambient conditions: Unless otherwise specified, all tests shall be conducted under conditions of ambient room temperature, pressure, and humidity. However, the room temperature shall be not lower than 10° C.

F. Warmup period: Unless otherwise specified, all tests shall be conducted after a warmup period of not less than 15 minutes.

G. Connected load: Unless otherwise specified, all tests shall be performed with the equipment connected to loads having the impedance values for which it is designed.

TACAN test signal

The characteristics of the TACAN test signal are:

Radiofrequency.—The frequency of the signal generator oscillator shall be maintained within ±0.005 percent of its specified frequency.

R–F pulse spectrum.—The energy level contained in a 0.5 mc. band centered on a frequency ±0.8 mc. from the channel frequency shall be at least 25 db below the energy level contained in a 0.5 mc. band centered on the channel frequency. The energy level contained in a 0.5 mc. band centered on a frequency ±2.0 mc. from the channel frequency shall be at least 40 db below the energy level contained in a 0.5 mc. band centered on the channel frequency. Each lobe of the spectrum shall be of less amplitude than the adjacent lobe nearer the center frequency.

CW output.—CW output between pulses shall be at least 50 db below the peak level of the pulses.

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[1] The application of these tests may result in damage to the equipment under test. Therefore, they may be conducted after the other tests are completed.

Requirements for adjacent channel interference measurements.—The following specifications apply when adjacent channel interference measurements are made:

(*a*) The oscillator output frequency shall be within 0.002 percent of the specified frequency.

(*b*) The r–f pulse spectrum, as defined in r–f pulse spectrum, shall require 60 db in lieu of 25 db and 65 db in lieu of 40 db.

(*c*) CW output, as specified in CW output, shall be at least 70 db below the peak level of the pulses.

Pulse shape.—The pulse envelope as detected by a linear detector shall have a rounded shape falling within the following limits:

(*a*) Pulse top: The instantaneous amplitude of the pulse shall not, at any instant between the point of the leading edge which is 95 percent of maximum amplitude and the point of the trailing edge which is 95 percent of the maximum amplitude, fall below a line which is 95 percent of the maximum voltage amplitude of the pulse and is parallel to the base line.

(*b*) Pulse rise time: The time required for the leading edge of the pulse to rise from 10 to 90 percent of its maximum voltage amplitude shall be 2.5 ±0.5 microseconds.

(*c*) Pulse fall time: The time required for the trailing edge of the pulse to fall from 90 to 10 percent of its maximum voltage amplitude shall be 2.5 ±0.5 microseconds.

(*d*) Pulse duration: The pulse duration, which is measured between the points on the leading and trailing edges of the pulse which are 50 percent of the maximum voltage amplitude of the pulse, shall be 3.5 ±0.5 micro seconds.

Pulse droop.—Without amplitude modulation of the composite r–f pulse train, any pulse in a pair, or in the main reference group, shall not deviate from the average peak amplitude by more than ±2.0 percent and any pulse in an auxiliary reference group shall not deviate by more than ±1.0 percent. In addition, the recovery time following this droop shall be such that the 135-cycle component of amplitude modulation, due to droop, shall not introduce an error greater than 0.08% for modulation depths (of 135 cycles per second) of 5 percent and greater. (Attention is drawn to the fact that if the longest recovery time is used, the droop must be on the order of 0.2 percent.)

Pulse coding.—The pulses shall be coded in pairs with a spacing which shall be 12 ±0.25 microseconds as measured at the 50 percent maximum voltage amplitude points from the leading edge of the first pulse to the leading edge of the second pulse.

Main reference pulse group.—The 15-cycle reference bearing signal, called the main reference group, shall consist of a group of 12 pairs of pulses. The spacing between pairs shall be 30 ±0.3 microseconds. The repetition rate of the group shall be 15 cycles per second ±0.2 percent.

Auxiliary reference pulse group.—The 135-cycle reference bearing signal, called auxiliary reference group, shall consist of a group of 6 pairs of pulses. The spacing between pairs shall be 24±0.25 microsecond. The repetition rate shall be 135 cycles per second and shall be precisely synchronized with the main reference group; however, the auxiliary group which would otherwise coincide in time with the main reference group, shall be removed so that only the main reference group appears in this position in the final output signal.

Precedence.—The main and auxiliary reference groups shall have precedence over random, identity, and distance reply pulses; therefore, these pulses shall not appear during a main or auxiliary reference group.

Identification-test signal.—The identification signal shall consist of a series of paired pulses transmitted at a repetition rate of 1,350 pulse pairs per second, phase-locked within ±50 microseconds of the 10th harmonic of the 135-cycle reference bearing signal. The first pulse of an identity pair shall occur 740±50 microseconds after the first pulse of each auxiliary reference group. Distance replies shall be removed during generation of the identity signal.

Equalizing pulse pair.—To preserve a constant duty cycle and to eliminate bearing error during identity signals, an equalizing pair of pulses shall be transmitted 100 microseconds ±10 microseconds after each identity pair.

Identity cycles.—When an automatic keyer is used to provide identity tone, the random and distance reply pulses shall be replaced by the identity pulses

at a recurrence rate of once every 30±10 percent seconds. During identity, the code shall be transmitted as dots and dashes (Morse Code) of identity pulses; the spaces between dots and dashes being occupied by random pulses. The dots shall be 0.125±10 percent seconds long; dashes shall be 0.375±10 percent seconds long. Key-down time per identity cycle shall not be more than 4 seconds out of 7.5 seconds, repeated every identity cycle.

Pulse repetition rate.—In addition to the reference pulse groups, the signal shall have a randomly distributed pulse repetition rate which shall be maintained at 2700±90 pairs per second before the reference groups are added to the signal; the random rate may include distance replies. The minimum spacing between any 2 consecutive random pulse pairs shall be 60±10 microseconds. The distribution of the random pulse spacing, for no-interrogation lead, shall fall within the limits shown in the graph, figure 1.

Composite 15 and 135 cycle variable bearing test signal.—The 15 and 135 cycle bearing signal shall be generated by the composite amplitude modulation of the radiofrequency pulse signals at 15 and 135 cycles per second. The combined amplitude modulation percentage shall be as given in the formula following. The amplitude modulation shall be synchronized with the 15 cycle main reference group so that, for a bearing of zero degrees, receiver south of the beacon, the 50 percent amplitude point on the leading edge of the 10th pulse of the main reference group will coincide with the positive slope point of inflection of the 15-cycle component of the bearing signal to within ±1.0°. The 50 percent amplitude point on the leading edge of the 12th pulse of each auxiliary reference group shall coincide with a positive slope point of inflection of the 135-cycle component of the bearing signal to within ±0.3° at 135 cycles. Viewed from above, the direction of pattern rotation shall be clockwise. In the absence of harmonics, the envelope of the detected r–f signal shall follow this formula:

$$y=1.0+A \sin (2\pi f t \pm \theta-\gamma)+B \sin (18\pi f t \pm \phi-9\gamma)$$

Where—

y=normalized composite 15–135-cycle signal amplitude.
A represents modulation of 15-cycle component.
A=variable from 0.12 to 0.30.
B represents modulation of 135-cycle component.
B=variable from 0.12 to 0.30.
The sum of A and B shall not exceed 0.55.
θ=1° maximum (of 15 cycles).
ϕ=0.3° maximum (of 135 cycles).
γ=bearing to the ground or shipboard station from the point of observation.
f=15.0 c.p.s. ±0.2 percent.
t=time in seconds from the corrected position of the 10th pulse of the main reference group. This is computed from the average position of the 12th pulse of each auxiliary reference group.

Harmonic content.—The harmonic content of the 15 and 135 c. p. s. components of the radiated signal (other than the 9th harmonic of 15 and the 10th harmonic of 135) shall not exceed 20 percent for each component.

Variable bearing rate.—Provision shall be made to change the bearing at a uniform rate up to 10° per second.

Distance reply signal.—The distance reply signal shall consist of a pair of pulses transmitted in response to a pair of interrogating pulses. The time delay measured from the leading edge of the second interrogating pulse at the input to the test set to the leading edge of the second reply pulse at the output from the test set shall be 50 ±0.25 microsecond when the test set is adjusted for zero mile range. For other range settings of the test equipment, the time delay in microseconds between the input interrogations and output replies shall be: 50±0.5+12.359 times the distance in international nautical miles.

Reply efficiency.—Reply efficiency is defined by:

$$\frac{\text{Number of replies per second}}{\text{Number of interrogations per second}} \times 100 \text{ percent}$$

Provision shall be made for varying reply efficiency from the maximum down to 40 percent.

Variable range rate.—Provision shall be made for changing the range at a uniform rate to stimulate aircraft speeds up to 3,000 knots.

The test procedures set forth herein are satisfactory for use in determining the performance of airborne TACAN distance-measuring equipment. Test procedures which provide equivalent information may be used.

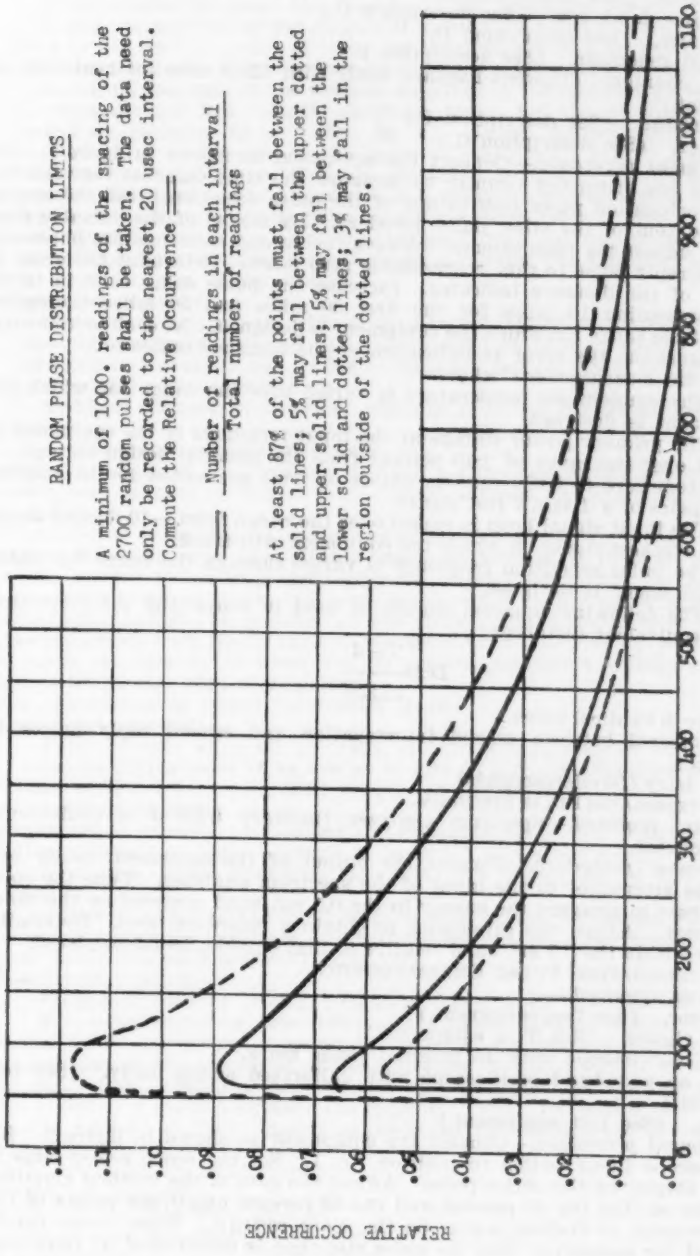
RANDOM PULSE DISTRIBUTION LIMITS
A minimum of 1000. readings of the spacing of the 2700 random pulses shall be taken. The data need only be recorded to the nearest 20 usec interval. Compute the Relative Occurrence =
Number of readings in each interval / Total number of readings
At least 87% of the points must fall between the solid lines; 5% may fall between the upper dotted and upper solid lines; 5% may fall between the lower solid and dotted lines; 3% may fall in the region outside of the dotted lines.
RELATIVE OCCURRENCE
.12
.11
.10
.09
.08
.07
.06
.05
.04
.03
.02
.01
.00
0
100
200
300
400
500
600
700
800
900
1000
1100
RANDOM PULSE SPACING TO NEAREST 20 USEC. INTERVAL

FIGURE 1

T–1 ACCURACY.

Equipment required.—

UHF detector. (See description A.)
Pulse decoder. (See description B.) (Two required.)
Variable time delay box. (See description C.)
Pulse encoder. (See description D.)
UHF signal generator. (See description E.)
Frequency counter. (Hewlett-Packard 524B with 526B time interval unit, or equivalent.)
Fruit generator. (See description F.)
T-pad mixer. (See description G.)

Measurement procedure.—Connect the equipment as shown in figure 1. Set and adjust the frequency counter to measure the time interval between the second interrogation pulse (out of one of the pulse decorders) and the second reply pulse (out of the other pulse decoder). By means of the variable time delay box, adjust the time interval between the second interrogation pulse and the second reply pulse to that representing zero miles. Determine the error in indication of the distance indicator. Increase the pulse delay time in increments representing 10 miles for the first 30 miles and 50 miles thereafter throughout the range for which the equipment is designed. At each incremental setting, determine the error in indication of the distance indicator.

Repeat the measurements when—

a. The ambient air temperature is varied over the range for which the equipment is designed.

b. The primary power voltage at the input terminals of the equipment is varied over the range of ±10 percent from the nominal design voltage.

c. From zero to 6,000 random pulses of fruit are added to the random pulse pairs of a TACAN test signal.

d. The input signal level is varied over the range from —10 decibel meter to the weakest signal on which the equipment will track.

e. The pulse repetition frequency is varied through the range for which the equipment is designed.

NOTE.—The following equation should be used in converting time measurements to equivalent distances:

$$D=\frac{T-d}{12{,}359}$$

D=distance in nautical miles
T=time interval between second interrogation and second reply pulses in microseconds.
d=system delay (50 microseconds)

T–2 INTERROGATOR PULSE SPECTRUM.

Equipment required.—Spectrum analyzer (military URN–3 or equivalent)
UHF attenuator.

Measurement procedure.—Connect the output of the equipment under test through the attenuator to the input of the spectrum analyzer. Tune the spectrum analyzer to measure the energy in the 0.5 mc. band centered on the channel frequency. Adjust the attenuator to obtain a reference level. Determine the energy within the 0.5 mc. band relative to that outside the 0.5 mc. band.

T–3 INTERROGATION PULSE CHARACTERISTICS.

Equipment required.—

UHF detector. (See Test equipment.)
Pulse top viewer. (See Test equipment.)
Wide-band oscilloscope with an internal range mark.
Generator or wide-band oscilloscope with calibrated sweep delay. (See test equipment.)
Delay line. (See test equipment.)

Measurement procedure.—Connect the equipment as shown in figure 2. Set the oscilloscope input switch to position No. 1. Set the scope sweep time to produce a display of the entire pulse. Adjust the gain of the vertical amplifier of the scope so that the 10 percent and the 90 percent amplitude points of the pulse correspond to distinct marks on the scope reticule. When range marks are utilized for measuring time the pulse rise time is determined by interpolation of the displayed range marks in relation to the previously determined 10 percent and 90 percent points. When the variable sweep delay technique is used, the pulse is located within the delayed sweep. The sweep delay time is varied until the 10 percent and the 90 percent amplitude reference points are

caused to move past a preselected vertical reference mark on the scope reticule. Readings are taken from the delay dial of the scope for each point and the difference between the two gives the time interval.

a. Determine the pulse rise time using the procedure described above.

b. Determine the pulse fall time using the procedure described above.

c. Set the position of the displayed pulse with respect to the reticule so that the 50 percent points of the pulse envelope are on a horizontal reticule line and determine the pulse duration using the procedures described above.

d. Adjust the gain of the vertical amplifier of the oscilloscope to produce a pulse display five reticule divisions high. Set the oscilloscope input switch to position No. 2. (See fig. 1.) Adjust potentiometer Rx until only the top 20 percent of the pulse is displayed. Adjust the gain of the vertical amplifier so that the displayed portion of the pulse is four reticule divisions high. Determine the pulse top characteristic by noting whether the instantaneous pulse amplitude drops more or less than 5 percent from its maximum amplitude between the 2 extreme points at which the pulse amplitude is 95 percent of the maximum pulse amplitude.

T–4 INTERROGATOR PULSE CODING.

Equipment required.—

Wide-band oscilloscope with time markers (provided externally or internally) preferably spaced at 1 microsecond or 12 microsecond intervals. (Tektronix Model 513, 514, or 534 equipments, test set TS–34 or equivalent.)

A crystal video detector.

Artificial antenna of sufficient capacity to accept the transmitter output power.

A directional coupler-attenuator.

NOTE.—A length of transmission line and a fixed pad having proper characteristics may be used in lieu of the artificial antenna and directional coupler-attenuator.

Measurement procedure.—Connect the equipment as shown in figure 4.

Adjust the oscilloscope to produce a sweep deviation of 15 to 20 microseconds. With the marker pulses displayed, apply the transmitter output pulses through the directional coupler-attenuator and the detector to the video input of the oscilloscope. Adjust the position of the pulses on the oscilloscope until the markers coincide with the 50 percent voltage point on the rise of the first pulse. Determine the spacing between the 50 percent maximum voltage amplitude points on the leading edge of the pulses.

T–5 INTERROGATOR PULSE REPETITION RATE.

Equipment required.—

Pulse counter with an accuracy of ±3 percent capable of measuring pulse repetition rates of as low as 10 and as high as 200 pulses per second (Hewlett-Packard model 524B counter or equivalent).

Artificial antenna.

Measurement procedure.—Connect the equipment as shown in figure 5.

Adjust the pulse counter to count at least 175 pulses per second. Determine the interrogator pulse repetition rate with the equipment in the "search" function.

Adjust the pulse counter to count from 10 to 50 pulses per second. Determine the interrogator pulse repetition rate with the equipment in the "track" function.

T–6 INTERROGATOR FREQUENCY STABILITY.

Equipment required.—

Frequency counter (Hewlett-Packard model 524B or equivalent).

Frequency converter (Hewlett-Packard model 525A or equivalent).

Measurement procedure.—Connect the input of the frequency counter to the converter and couple the input of the converter to the oscillator of the equipment under test. Coupling may be made by connecting to a suitable test point or by means of a probe held near the oscillator tube. Determine the frequency from the reading of the frequency counter and the multiplying factor used in the frequency converter.

T–7 INTERROGATOR PEAK POWER.

Equipment required.—

UHF detector (see description A).

Fixed attenuator (general radio type or equivalent).

DC voltmeter (or equivalent).

Measurement procedure.—Connect the items of equipment as shown in figure 3, inserting the fixed attenuator between the interrogator output and the UHF detector input. Starting with minimum slide-back voltage slowly increase the slide-back voltage until there remains on the oscilloscope only a slight detection

of the signal by the UHF detector. Record that DC slide-back voltage at which signal detection just begins to be observable.

The interrogator peak power is then nearly equal to

$$\frac{V^2a}{Z}$$

where V is the DC slide-back voltage, Z is the actual RF impedance of the fixed attenuator, and a is the loss factor of the fixed attenuator.

NOTE.—The fixed attenuator should present a known impedance (which matches the interrogator output and the UHF detector) and have a known attenuation factor. The amount of attenuation should be chosen to provide a peak voltage input to the UHF detector large enough to reduce the transit time error, but small enough not to damage the diode.

NOTE.—Peak pulse power measurement using the RF slide-back voltmeter: Basically the RF slide-back voltmeter consists of a resistive load shunted by a diode which can be biased to cutoff. The time constants of the diode load must be such that when the diode conducts the resulting video waveform follows very closely the peaks of the RF cycles in the pulse. When the diode is biased to cut off the biasing voltage then is equal to the peak of the highest RF cycles. By definition the RMS value of the highest amplitude RF cycle (exclusive of spikes) is the peak pulse voltage. The peak pulse power is obtained by squaring the peak pulse voltage and dividing by the resistance of the load.

The accuracy of the pulse power determination when made as described is limited by the following:

1. Transit time losses which cause the diode to appear cut off before the bias voltage is equal to the peak of the RF cycles.
2. The uncertainty of the exact value of the load impedance across which the peak pulse voltage is being developed.

The inaccuracies due to transit time effects are materially reduced when using high amplitude signals and diodes having small transit time effects. At higher frequencies the potential difference between cathode and plate of the diode must be higher in order to maintain detectable conduction in the diode. Hence, the apparent cutoff voltage is reduced. This in essence produces a measurement resulting in a voltage determination whose magnitude is less than the actual peak value of the RF wave form. Measurements indicate that errors in the determination of the RF voltage due to transit time effects are in the order of 10 percent for equipment on hand. Therefore, the possible error in the power measurement due to transit time effects are in the order of 10 percent for equipment on hand. Therefore, the possible error in the power measurement due to transit time effects is in the range of ±20 percent.

The second main source of error is the RF load across which the peak pulse voltage is measured. The percent error in the power measurement due to the resistive load is equal to the percent deviation of the impedance from its nominal value. In actual practice a broadband resistive load can be maintained within ±10 percent of its nominal value over the range of operation. Total errors, then, for this equipment should be in the order of ±30 percent.

T–8 SPURIOUS RADIATION.

Equipment required.—

Spectrum analyzer (F–R Machine Works, type L701A or equivalent)

UHF attenuator

Noise and field strength meters as follows: Stoddard NM–20B, NMA–5A, and NM–50A or equivalent. AN/URM–17 test set or equivalent.

Artificial antenna.

Measurement procedure.—

a. Connect the output of the equipment under test to the UHF attenuator, and connect the UHF attenuator to the spectrum analyzer. Tune the spectrum analyzer to the center frequency of the pulse. Using the output level of the pulse as a reference, adjust the spectrum analyzer so that signals having a level greater than 40 db below the peak pulse power can be detected. Tune the spectrum analyzer through the frequency range 960 to 1215 Mc and determine whether there are any signals, during the interval between the pulses of a pulse group or between groups of pulses, which are greater than 40 db below the peak pulse power.

b. Connect the output of the equipment under test to an artificial antenna having an impedance equal to that for which the equipment is designed. All input power leads, control leads, and other wiring except antenna circuits shall be 10 to 12 feet in length, normally terminated and cabled, but not enclosed in conduit. Operate the transmitter. With the noise

meter, determine whether there are any signals within the band .190 to 1500 Mc, excluding the band 960 to 1215 Mc, (1) between any two cable terminals or any cable terminal and ground which exceeds 200 uv, (2) across the test antenna which exceeds 400 micromicrowatts.

T–9 RECEIVER SENSITIVITY.

Equipment required.—

UHF detector (see description A)
Pulse decoder (see description B)
Variable time delay box (see description C)
Pulse encoder (see description D)
UHF signal generator (see description E)
Fruit generator (see description F)

Measurement procedure.—Connect the equipment as shown in figure 1.

a. Determine the input signal level required to effect a successful end of search 9 out of 10 times in the presence of normal fruit.

b. Determine the input signal level required to effect a successful end of search 9 out of 10 times in the presence of maximum fruit.

c. Determine the input signal level required to maintain tracking in the presence of normal fruit.

d. Determine the input signal level required to maintain tracking in the presence of maximum fruit.

T–10 RECEIVER SELECTIVITY.

Equipment required.—

UHF detector. (See description A.)
Pulse decoder. (See description B.)
Variable time delay box. (See description C.)
Pulse encoder. (See description D.)
UHF signal generator. (See description E.)
T-pad mixer. (See description G.)

Measurement procedure.—Connect equipment as shown in figure 1. Set the variable time delay box to produce a delay time representing a distance of 10 miles or more.

Set the signal generator to the selected channel frequency and adjust its output level to obtain a successful end of search 9 out of 10 searching cycles. This signal generator output level is reference level.

(*a*) Increase the signal generator output 6 db above reference level. Determine the frequencies on both sides of receiver resonance at which a succesful end of search occurs 9 out of 10 searching cycles.

(*b*) Increase the signal generator output 30 db above reference level. Determine the frequencies on both sides of receiver resonance at which a successful end of search occurs once out of 10 searching cycles and which results in a tracking duration no greater than 5 seconds.

T–11 RECEIVER DECODER SELECTIVITY.

Equipment required.—

UHF detector. (See description A.)
Pulse decoder. (See description B.)
Variable time delay box. (See description C.)
Pulse encoder. (See description D.)
UHF signal generator. (See description E.)
T-pad mixer. (See description G.)
Oscilloscope. (Tektronix model 514, or equivalent.)

Measurement procedure.—Connect equipment as shown in figure 1 with the oscilloscope connected to the output of the pulse encoder for pulse spacing measurements. Set the variable time delay box to produce a delay time representing a distance of 10 miles or more.

a. Set the pulse encoder to produce pairs of output pulses with a spacing of 12.0 $\pm$0.1 u sec. between the pulses of each pair. Set the signal generator to the selected channel frequency and adjust its output to produce a receiver input level of —60 dbm.

b. Set the pulse encoder to produce output pulses spaced 11.5 u sec. and determine the number of sucessful end of searches out of 10. Increase the pulse spacing to 12.5 u sec. and again determine the number of successful end of searches out of ten.

c. Set the pulse spacing to 11.0 u sec. and determine the number of successful end of searches out of 10 and their duration. Set the pulse spacing

31829—58——30

to 13.0 u sec. and again determine the number of successful end of searches out of 10 and their duration.

d. Repeat b. and c., above, with the receiver input set to −80 dbn.

T–12 SEARCH SPEED.

Equipment required.—Stopwatch.

Measurement procedure.—Start the stopwatch as the distance indicating device sweeps through 0 mile, and stop it when it reaches maximum range.

Determine the searching speed in miles per second by dividing the total search (in miles) by the time interval in seconds as measured by the stopwatch.

T–13 AMPLITUDE SELECTIVITY.

Equipment required.—2–UHF signal generators (see description E) coupling unit.

Measurement procedure.—Connect the two signal generators through the coupling unit to the receiver input. Tune both signal generators to the resonant frequency of the receiver. Adjust the output of one of the signal generators (SG No. 1) to produce successively inputs of −75 dbm, −50 dbm, and −25 dbm to the receiver. Adjust the output of other signal generator (SG No. 2) to produce a signal at the receiver input 20 db below that of signal generator No. 1. Turn signal generator No. 1 on and off and determine whether the receiver always responds to signal generator No. 1.

T–14 SPURIOUS RESPONSE AND INTERMODULATION.

Equipment required.—

2–UHF TACAN signal generators. (See description E.)

CW Signal generators to cover the range 90 kc. to 10,000 mc.

Coupling Unit.

Measurement procedure.—

a. Connect one of the UHF TACAN signal generators and each of the CW signal generators, one at a time, to the coupling unit, and connect the coupling unit to the receiver.

With no cw signal applied, tune the TACAN signal generator to resonance with the receiver and adjust its level to 2 db above that which produces a successful end of search nine out of ten searching cycles. Apply a CW signal of −30 dbm to the input of the receiver. Vary the frequency of the CW signal slowly through the range of 90 kc. to 10,000 mc. excluding the frequencies within 3 mc. of the assigned channel frequency to which the receiver is tuned and determine whether "tracking" of the TACAN signal is interrupted.

b. Connect the two TACAN signal generators, identified as No. 1 and No. 2, to the receiver input through the coupling unit. With the output of No. 1 signal generator reduced to zero, determine the signal level required from No. 2 generator to produce a successful end of search 9 out of 10 searching cycles at the frequency to which the receiver is tuned. Increase the output level of the No. 1 signal generator to 50 db above that of the No. 2 generator and determine whether the receiver will track when the frequency of the No. 1 signal generator is adjusted successively to each of the 1 mc. TACAN frequencies over the band 960 to 1215 mc. except the frequency to which the receiver is tuned.

DESCRIPTION OF TEST EQUIPMENT

A. *UHF detector.*—The UHF detector consists of a diode detector such as an RCA-type 6173 pencil diode mounted in a concentric type cavity with the proper dimensions to make a broad band 50 ohm load throughout the frequency band with which it will be used. The average power input to the diode should not exceed 0.5 watt or the peak R. F. voltage should not exceed 100 volts. The diode operated within these limits will produce negligible distortion and will have sufficient output to feed a wide band synchroscope directly. However, a cathode follower should be inserted between the diode and the synchroscope for isolation. For peak power measurements, the circuit of the diode should

provide means for applying a known DC cutoff bias used in the slide-back voltmeter-type operation.

B. *Pulse decoder.*—This is a device for eliminating the initial pulse of a pulse pair spaced 12 microseconds. Video pulse pairs are fed into the device. Only the second pulse of each pair appears as an output signal with less than 0.1 microsecond delay.

C. *Variable time delay box.*—This device accepts the pulse decoder output signal as a trigger pulse. It generates an output pulse which follows the trigger by time delay which can be varied from 50 to 2,500 microseconds.

D. *Pulse encoder.*—This device accepts the delay box output signal and the fruit generator output signal as trigger pulses. When triggered, it generates pulse pairs adjustable in spacing from approximately 10 to 14 microseconds, having a shape and amplitude such that the UHF signal generator can be pulse modulated with the standard TACAN pulse. The spacing of the pulse pairs is adjustable to an accuracy of ± 0.1 μ sec.

E. *UHF signal generator.*—The Signal generator must have the following characteristics:

1. Frequency range, include 960 to 1215 mc.
2. Output range, include —10 dbm to —80 dbm.
3. Modulator, capable of generating standard TACAN pulses of known strength when driven by the pulse encoder.
4. Output impedance, must match interrogator receiver.
5. A demodulated output jack is needed to operate the pulse decoder used for accessory measurements.

F. *Fruit generator.*—This device generates random timed pulses which are mixed with the interrogation pulses. The fruit generator should be capable of producing from 0 to 3,600 random spaced pulses per second.

G. *T-pad mixer.*—This device is a T-pad attenuator which serves to couple the DMET interrogator antenna jack to the UHF detector, and to the UHF signal generator. It should match the impedances of all three devices to which it is connected, and provide attenuation as needed to protect the UHF signal generator and the UHF detector circuits from the high level DMET interrogation pulses. The device must be capable of handling the power levels involved. The attenuation factor must be known, and added to the VHF signal generator output to determine the input signal level to the interrogator.

H. *Pulse top viewer.*—The pulse top viewer consists of a diode, a voltage divider, and a coupling condenser used in conjunction with the isolation cathode follower mentioned in A above to provide a means for displaying only the top 20 percent of the pulse wave-form on the scope. For connections of these components, see Figure 1.

I. *Wide-band oscilloscope with internal range mark generator.*—Oscilloscope should have a band width of at least 2 mc. Range marks synchronized with the start of the sweep should be available at least every 0.5 μ sec.

NOTE.—The equipment described in either C or D may be used for pulse rise and fall time measurements.

J. *Wide-band oscilloscope with calibrated sweep delay.*—Oscilloscope should have a band width of at least 2 mc. Sweep delay should be continuously variable down to 2 or 3 μ secs. and have incremental calibration accuracy of $\pm .15$ μ sec. for the first 15 μ secs. of delay.

K. *Delay line.*—A high quality video delay line that is flat to 2 Mc. and with approximately 5 μ sec. total delay. Impedance should be sufficiently high to allow matching to cathode follower output.

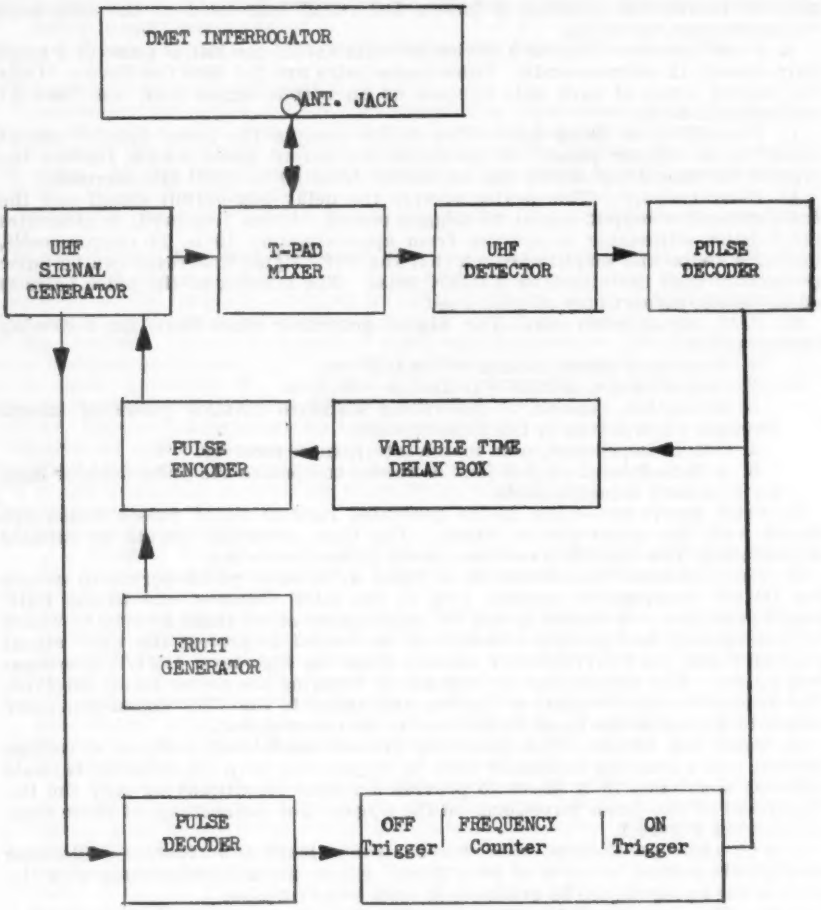
DMET INTERROGATOR
ANT. JACK
UHF SIGNAL GENERATOR
T-PAD MIXER
UHF DETECTOR
PULSE DECODER
PULSE ENCODER
VARIABLE TIME DELAY BOX
FRUIT GENERATOR
PULSE DECODER
OFF Trigger
FREQUENCY Counter
ON Trigger

FIGURE 1

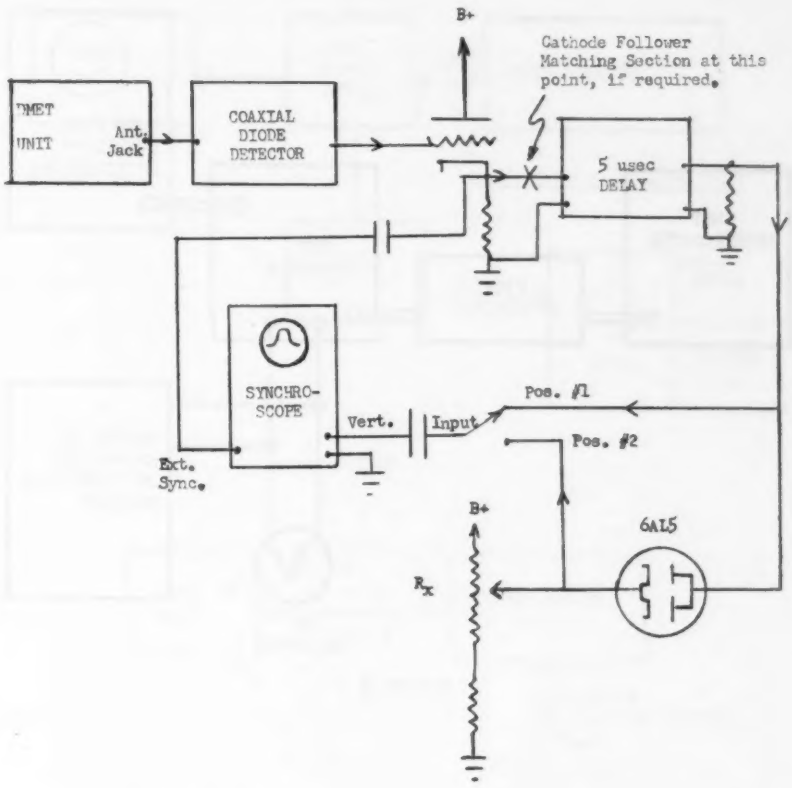
B+
Cathode Follower
Matching Section at this
point, if required.
DMET
UNIT
Ant.
Jack
COAXIAL
DIODE
DETECTOR
5 usec
DELAY
SYNCHRO-
SCOPE
Vert.
Input
Pos. #1
Pos. #2
Ext.
Sync.
B+
6AL5
R_x

Figure 2

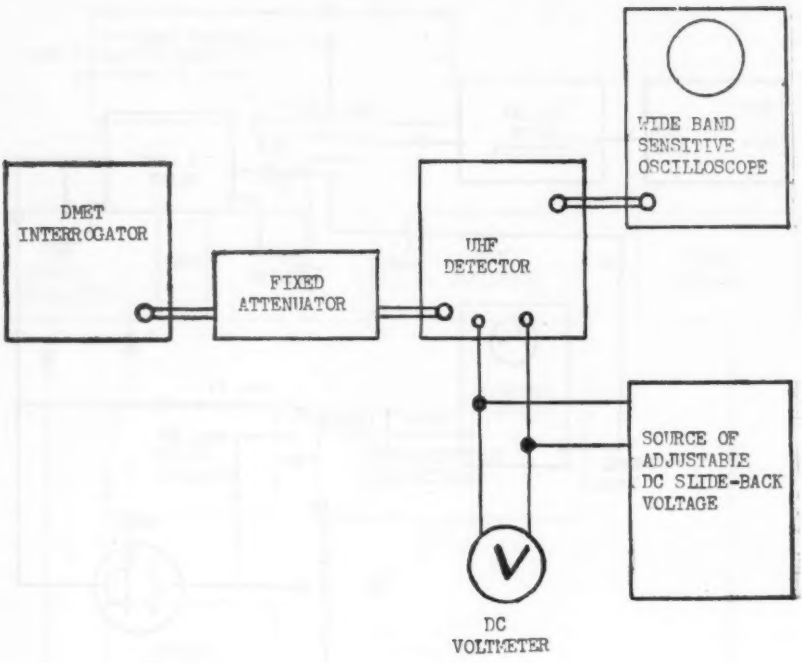
WIDE BAND
SENSITIVE
OSCILLOSCOPE
DMET
INTERROGATOR
FIXED
ATTENUATOR
UHF
DETECTOR
SOURCE OF
ADJUSTABLE
DC SLIDE-BACK
VOLTAGE
V
DC
VOLTMETER

FIGURE 3

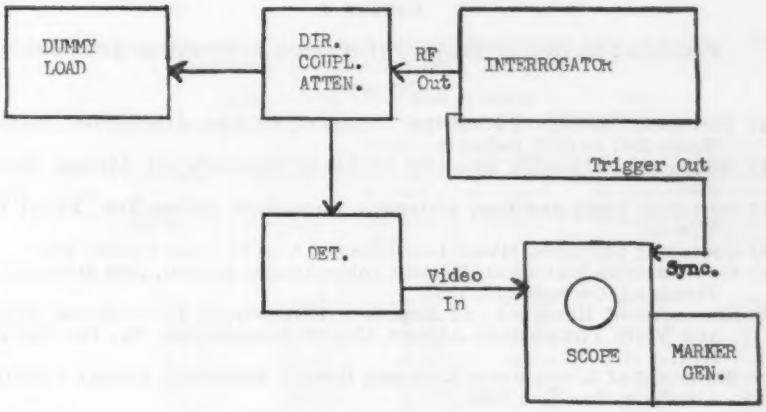

Figure 4

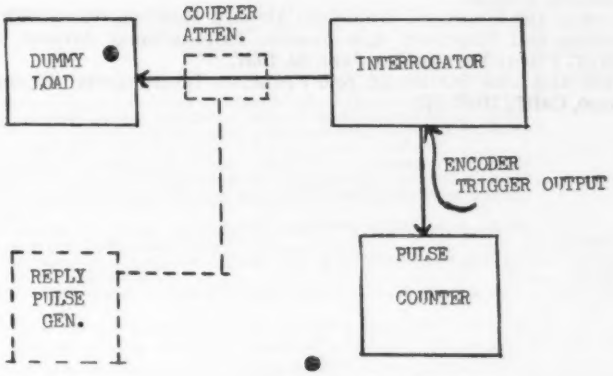

Figure 5

EXHIBIT 3

FINANCIAL RECORDS OF AIRPORTS (OPERATING STATEMENTS, AIRPORTS)

CONTENTS

(*a*) Statement: Results of Municipal Airport Operations, Atlanta, Ga., Calendar Years 1947 to 1957, inclusive.
(*b*) Statement: Financial situation at Logan International Airport, Boston, Mass.
(*c*) Operating Profit and Loss Statement, Love Field, Dallas, Tex., Fiscal Year 1956–57.
(*d*) Operating Expenses, Miami International Airport, Dade County, Fla.
(*e*) Cost Analysis Statement, Moisant International Airport, New Orleans, La., January 1–December 31, 1957.
(*f*) Statement of Revenues and Expenses, Philadelphia International Airport and North Philadelphia Airport, City of Philadelphia, Pa., For the Year 1957.
(*g*) Statement of Revenue and Expenses, Greater Pittsburgh Airport, County of Allegheny, Pa., Year 1957.
(*h*) Profit and Loss Statement, Lambert-St. Louis Municipal Airport, April 1956 through March 1957.
(*i*) Income and Expense, Cleveland Hopkins Airport, Cleveland, Ohio, January 1–December 31, 1957.
(*j*) Revenue and Expenses—Minneapolis-St. Paul Metropolitan Airports Commission, 1943–56.
(*k*) Revenue and Expenses, Municipal Airport, Houston, Tex., 1957.
(*l*) Revenue and Expenses, Los Angeles International Airport, Los Angeles, Calif., Fiscal Year ending June 30, 1957.
(*m*) Profit and Loss Statement, San Francisco International Airport, San Francisco, Calif., 1956–57.

(*a*)

Statement showing results of municipal airport operations, city of Atlanta, Ga., calendar years 1947 to 1957, inclusive

[Rounded to the nearest hundred dollars]

Calendar year	Total cost of airport operations (see folio 2)	Gross revenue from airport operations	Cost of operations over (under) revenue before reductions on right	Approximate depreciation on donated facility costs	Approximate revenue allocated by law [1]	Revenue under operating costs, charges for indicated depreciation and allocated revenue
1947	$100,100	$59,500	$40,600	$24,700	$17,900	$83,200
1948	167,200	135,300	31,900	26,500	40,600	99,000
1949	218,100	203,100	15,000	48,200	60,900	124,100
1950	264,200	240,300	23,900	91,000	72,100	187,000
1951	297,300	286,400	10,900	103,000	85,900	199,800
1952	424,900	324,600	100,300	112,700	97,400	310,400
1953	383,800	331,900	51,900	173,400	99,600	324,900
1954	403,100	377,500	25,600	172,700	113,300	311,600
1955	434,100	475,700	(41,600)	177,600	142,700	278,700
1956	529,700	587,000	(57,300)	178,700	208,700	330,100
1957	625,000	721,600	(96,600)	186,700	292,600	382,700
Total	3,847,500	3,742,900	104,600	1,295,200	1,231,700	2,631,500

[1] The $1,231,700 approximate revenue allocated by law is comprised of the following:

Explanation	Details	Totals
Approximate revenue paid to City of Atlanta School Department during the calendar years 1947 to 1956, inclusive. (Since these payments were required by Georgia law applicable to the said years, this revenue could not therefore be used, except as a temporary fund, to defray operating costs)[a]		$898,100
Revenue allocated to comply with provisions of city's ordinance relating to $2,000,000 City of Atlanta Airport revenue anticipation certificates, series 1956, issue (exclusive of interest cost included in $498,600 interest expense, per folio 2):		
To retire airport revenue anticipation certificates ($41,000 and $42,000, during 1956 and 1957, respectively)	$83,000	
To accumulate in the airport sinking fund a reserve for principal and interest requirements	25,200	
To establish an airport renewal and repair fund	225,400	333,600
Total		1,231,700

[a] As a result of a revision of the previously applicable Georgia law, the city was not required to pay, after 1956, a percentage of its gross revenues to the City of Atlanta School Department.

(*b*)

THE COMMONWEALTH OF MASSACHUSETTS,
STATE AIRPORT MANAGEMENT BOARD,
COMMISSIONER OF AIRPORT MANAGEMENT,
LOGAN INTERNATIONAL AIRPORT,
East Boston.

The following comments on the overall financial situation at Logan International Airport is submitted to assist the Board in its long-range planning of rates and charges.

The figures contained herein indicate conclusively that Logan International Airport is not a burden to the taxpayers of the State, but rather is one of its greatest financial assets.

The basic source of this financial information is the State auditor's report, dated June 28, 1957, which covered period 1941 through April 8, 1957.

The information for period April 8, 1957, through June 30, 1957, was taken from SAMB records.

The projection of income and expense is a conservative estimate, based on established trends, as shown herein.

I. EXPENDITURES

A. Total State expenditures, including principal payments on bonds, interest on bonds, capital outlay expense and operating expense in connection with Logan International Airport from 1941 through June 30, 1957, totals as follows:

1. Principal payments on bonds	$35,133,000
2. Interest on bonds	3,781,177
3. Capital outlay expense	1,418,675
4. Operating expense	5,321,674
Total State expense through fiscal 1957	45,654,526
B. Future total principal payments to be made by State between 1957–77	14,375,000
C. Future total interest payments to be made by State 1957–77	1,285,178
D. Future total operating costs to be incurred fiscal 1958–77	20,000,000
By 1977 State will have spent on Logan Airport	81,314,704
Operating and maintenance, fiscal 1957 (July 1, 1956–June 30, 1957)	903,925

II. INCOME

Total income from Logan International Airport to State, including revenue from charges and Federal reimbursement:

1. Revenue from charges fiscal 1941 through 1957	$9,017,896
2. Income to State from Federal grants through 1957	1,394,966
3. Estimated gross revenue from charges fiscal 1958–77 [1]	70,000,000
Total income by 1977	80,412,862

[1] This estimate is based upon following financial record of the SAMB and is conservatively projected on anticipated growth of traffic:

Fiscal year:	*Actual income, cash basis*	Fiscal year:	*Actual income, cash basis*
1949	$382,772	1954	$960,672
1950	445,838	1955	1,001,570
1951	648,378	1956	1,481,580
1952	787,830	1957 (earned income)	1,741,047
1953	905,142		

The preliminary financial and traffic figures for the first 3 months of fiscal 1958 indicate gross income for fiscal 1958 will aproximate $2 million.

When the 4 hangars and the new freight terminal are constructed and in operation, there will be an additional net operating profit to the board of about $250,000 per annum (over and above principal and interest payments).

When contemplated second floor on Boutwell Building is completed, there will be a net operating profit to board of about $250,000 (over and above principal and interest payments).

CONCLUSION

Total cost to State from 1941 to 1977 including principal payments, interest and operating costs and capital outlay	$81,000,000
Total income to State from 1941 to 1977	80,412,862

At this time, the State will be entirely reimbursed for all expenditures in connection with Logan International Airport and, in addition, will own outright the airport, an asset conservatively estimated today at a replacement cost of $70 million.

NOTE.—While it is true that certain future capital investments will be made at Logan Airport, the expenditures will be made only in accordance with board policy that they shall be self-liquidating.

Therefore, additional income from such future expenditures will only hasten the day when the airport will be fully paid for.

(c)

AVIATION DEPARTMENT, LOVE FIELD, DALLAS, TEX.

Operating profit and loss statement, fiscal year 1956–57

	Love Field	Redbird	Total
Operating income:			
I. Rentals	$428,919.77	$13,609.75	$442,529.52
II. Fees	203,554.33	3,107.67	206,662.00
III. Concessions	307,312.43		307,312.43
IV. Service charges	31,360.73		31,360.73
Total	971,147.26	16,717.42	987,864.68
Operating expenses:			
I. Personal services	97,622.61	29,239.60	126,862.21
II. Supplies	18,155.28	1,598.54	19,753.82
III. Maintenance—structures	9,454.09	427.69	9,881.78
IV. Maintenance—equipment	2,004.99	35.99	2,040.98
V. Miscellaneous services	39,431.27	31,855.70	71,286.97
VI. Sundry charges	581,185.68	1,000.00	582,185.68
VII. Equipment	4,904.95	4,183.26	9,088.21
Total	752,758.87	68,340.78	821,099.65
Operating profit	218,388.39	−51,623.36	166,765.03

(d)

MIAMI INTERNATIONAL AIRPORT

DADE COUNTY PORT AUTHORITY: FARIS N. COWART, CHAIRMAN; GEORGE M'SHERRY, DIRECTOR

Balance sheet, Sept. 30, 1957, Dade County Port Authority, after audit report

ASSETS

Current assets—cash:		
Revenue fund	$414,958.36	
Building fund	1,434,259.92	
Improvement fund	56,252.47	
Bond interest fund	310,840.56	
Redemption fund	529.88	
Reserve fund	0	
Reserve maintenance fund	56,886.65	
Convair fund	25,571.06	
Escrow fund	307.62	
Temporary holding fund	2,000.00	
Special construction fund A	644,888.74	
Bond service fund	0	
Sinking fund reserve, special	1,112.52	
Special construction fund B	8,101.44	
Petty cash funds, MIA and VC	3,000.00	
		$2,958,709.22

Balance sheet, Sept. 30, 1957, Dade County Port Authority, after audit report— Continued

Other current assets:		
Accounts receivable	$229,258.53	
Accrued interest receivable	69,923.00	
Improvement fund receivable	950.96	
City of Miami, receivable	283,319.67	
		$583,452.16
Investments:		
Building fund	4,485,771.20	
Improvement fund	2,121,496.41	
Reserve fund	1,250,804.69	
Reserve maintenance fund	357,950.00	
Convair property fund	869,028.13	
Escrow fund	59,400.58	
Sinking fund reserve, special	26,945.00	
		9,171,396.01
Federal grants receivable:		
F. A. P. 9–08–027–221A	98,683.00	
F. A. P. 9–08–027–523	59,708.20	
F. A. P. 9–08–027–5724	638,332.00	
F. A. P. 9–08–027–5725	359,527.50	
		1,156,250.70
Property schedule:		
Miami International Airport, including work in progress	57,196,391.47	
Venetian Causeway	4,224,462.47	
Miami Country Club	793,806.46	
		62,214,660.40
Deferred Charges:		
Unexpired insurance	110,828.64	
Warehouse inventory, MIA	56,534.76	
Warehouse inventory, VC	2,653.33	
Unamortized bond discount 3⅛ percent bonds	321,155.52	
Unamortized bond discount NAL	59,218.56	
Unamortized bond issue expense 3⅛ percent	358,714.49	
Rehabilitation cost, runways	29,064.40	
		938,169.70
Total assets		77,022,638.19

LIABILITIES

Current liabilities:		
Accounts and contracts payable	$1,379,809.36	
Security deposits payable	10,246.50	
Advances from tenants	807,100.00	
		2,197,155.86
Sinking fund liabilities:		
Accrued interest, 3⅛ percent bonds	307,285.80	
Accrued interest, special bond issue A	63,766.12	
Accrued insurance expense	6,187.73	
		377,239.65
Long-term liabilities:		
3⅛ percent revenue bonds due October 1, 1979	19,660,000.00	
Special bond issue, due October 15, 1981	3,500,000.00	
Convair improvements, due March 31, 1966	869,187.51	
		24,029,187.51
Total liabilities		26,603,583.02
Prepaid income:		
Convair, original purchase, 1946	$163,334.07	
Convair subsequent improvements	1,056,889.50	
Eastern Air Lines new hangar and apron	4,298,032.13	

Balance sheet, Sept. 30, 1957, Dade County Port Authority, after audit report—Continued

Prepaid income—Continued		
National Air Lines shop and new office and hangar	587,488.32	
Other prepaid income	272,670.39	
Prepaid construction cost	85,720.00	
Prepaid insurance	866.86	
Prepaid emblem sales	10,125.94	
Total prepaid income		$6,475,127.21
SURPLUS		
Government grant surplus:		
U. S. Government	27,581,876.44	
Dade County	3,199,661.36	
		30,781,537.80
Earned surplus:		
Balance Oct. 1, 1956	10,137,136.51	
Net income fiscal year	2,553,453.65	
		12,690,590.16
Appraisal surplus: Appreciation, Convair property		471,800.00
Total surplus		43,943,927.96
Total liabilities, prepaid income and surplus (from above)		77,022,638.19

Combined statement of accrued income, Sept. 30, 1957, Dade County Port Authority, after audit report

	Year end Sept. 30, 1957	Year end Sept. 30, 1956
AIRPORT INCOME		
Rental income:		
Hangars and shops	$271,751.35	$283,196.88
Terminal buildings	79,690.68	65,058.17
Other buildings	475,863.25	473,758.94
Machinery	6,075.76	6,227.04
Ground space	184,268.89	143,815.97
PAA 20.13 acres	29,231.28	29,231.28
PAA MIAD tract	25,000.00	25,000.00
Subtotal	1,071,881.21	1,026,288.28
PAA MIAD	75,000.00	75,000.00
Convair lease	151,699.08	152,738.58
EAL hangar	170,219.64	170,219.64
NAL shop	37,518.72	37,518.72
Total rental income	1,506,318.65	1,461,765.22
Aviation fees:		
Landings	466,250.56	419,666.99
Passengers	220,597.00	175,823.75
Cargo	121,090.50	91,784.00
Plane parking	24,502.00	13,573.00
Total aviation fees	832,440.06	700,847.74
Concession income:		
Aviation gas and oil	187,638.97	135,382.50
Transportation	525,865.37	421,346.54
Restaurants	66,728.89	55,868.79
Public telephones and lockers	19,299.42	11,165.94
Ramp services	23,487.08	15,759.58
Newsstand and gift shop	29,037.28	26,933.43
Insurance and vending machines	71,189.72	0
Miscellaneous vendors	22,815.94	37,021.86
Total concession income	946,062.67	703,478.64
Services to tenants	103,385.08	89,610.07

Combined statement of accrued income, Sept. 30, 1957, Dade County Port Authority, after audit report—Continued

	Year end Sept. 30, 1957	Year end Sept. 30, 1956
Other income:		
Auto parking fees	$117,239.18	$111,244.95
Miscellaneous	79,233.14	2,025.65
Interest	124,376.30	67,453.56
Gain or loss on investments	0	18,141.90
Total other income	320,848.62	198,866.06
Total airport income	3,709,055.08	3,154,567.73
Causeway income:		
Tolls	879,235.55	838,525.28
Rental and miscellaneous	7,042.02	11,797.04
Total causeway income	886,277.57	850,322.32
Total combined income	4,595,332.65	4,004,890.05
Airport expenses:		
Salaries and wages	597,543.78	540,056.16
Legal	20,324.20	0
Traveling	3,413.69	1,574.93
Supplies and services	88,945.39	71,043.94
Maintenance by contract	37,925.84	35,942.24
Maintenance allowance to PAA	75,000.00	75,000.00
Rehabilitation of Davis tract	0	30,902.01
Rehabilitation taxiways	7,266.00	7,266.00
Insurance	61,066.03	61,971.23
Utilities	87,352.53	80,453.06
Operation and maintenance of vehicles	26,419.18	24,359.66
Auditing	13,000.00	15,775.00
County police	135,843.72	135,843.72
Miscellaneous	1,955.72	20,451.01
OASI	12,303.65	0
Abandonment	65,704.34	0
Reserve maintenance fund	139,518.29	0
Total expenses	1,373,582.36	1,100,638.96
Net airport income	2,335,472.72	2,053,928.77
Causeway income	886,277.57	850,322.32
Causeway expenses:		
Salaries and wages	142,102.59	128,221.67
Legal	6,774.77	4,999.99
Supplies and services	8,599.08	17,095.10
Insurance	34,770.29	35,291.70
Utilities	13,012.48	12,593.93
Operation and maintenance of vehicles	3,508.04	2,934.37
Auditing	3,500.00	1,500.00
County police	18,835.44	18,835.41
Miscellaneous	12,000.00	12,000.00
OASI	2,766.22	0
Total expenses	245,868.91	233,472.17
Net causeway income	640,408.66	616,850.15
Total combined net income	2,975,881.38	2,670,778.92
Debt service and other:		
Interest on revenue bonds	321,662.01	342,191.38
Interest on special revenue bonds	0	0
Interest on others	63.58	0
Trustees fees	11,732.91	4,379.64
Escrow bond premium	0	2,597.22
Amortization of bond issue expense	36,042.59	22,353.43
Amortization of bond discount	32,272.48	20,675.09
Amortization of bond discount NAL	2,467.44	0
Interest Convair lease	3,186.72	3,186.72
Consulting engineer	15,000.00	13,583.36
Total	422,427.73	408,966.84
Net income to surplus	2,553,453.65	2,261,812.08

(c)

MOISANT INTERNATIONAL AIRPORT

Cost-analysis statement, 12 months ending Dec. 31, 1957

	Landing area	Terminal building and area	Rented building and area	Total operating	Construction and other	Total airport
Cash expenses:						
Direct costs:						
Personal services	$62,136.19	$114,452.83	$13,191.98	$189,781.00	$496.85	$190,277.85
Contractual services	13,679.61	22,618.83	3,617.53	39,915.97	8.50	39,924.47
Supplies and materials	7,620.83	8,837.59	418.84	16,877.26	2,994.17	19,871.43
Special current charges	38.37			38.37	100,303.00	100,341.37
Equipment, special repairs, and improvements	3,044.68	2,868.83		5,913.51	49,605.85	55,519.36
Subtotal direct costs	86,519.68	148,778.08	17,228.35	252,526.11	153,408.37	405,934.48
Allocated costs:						
Administration	91,148.80	131,491.28	23,270.62	245,910.70		245,910.70
General shop equipment, maintenance, and operation	19,934.05	2,657.87		22,591.92		22,591.92
Utility system	590.50	10,629.15	590.52	11,810.17		11,810.17
Subtotal direct costs	111,673.35	144,778.30	23,861.14	280,312.79		280,312.79
Total cash expenses	198,193.03	293,556.38	41,089.49	532,838.90	153,408.37	686,247.27
Revenues:						
Satellite income:						
Coin machines, telephone, etc		18,672.48		18,672.48		18,672.48
Reimbursed expenses	9,301.14	23,845.79	3,903.81	37,050.74		37,050.74
Concessions	7,451.20	55,253.11		62,704.31		62,704.31
Advertising		960.00		960.00		960.00
Ground rentals	345.50		7,256.08	7,601.58		7,601.58
Ground transportation		40,588.09		40,588.09		40,588.09
Management sales and services	3,255.84	47,535.20	2,700.00	53,491.04		53,491.01
Other income					19,962.50	19,962.50
Subtotal, satellite income	20,353.68	186,854.67	13,859.89	221,068.24	19,962.50	241,030.71
Cash expenses chargeable to users	177,839.35	106,701.71	27,229.60	311,770.66	133,445.87	445,216.53
Basic user income:						
Space rentals	6,000.00	186,942.13	52,277.16	245,219.29		245,219.29
Landing fees	215,377.86			215,377.86		215,377.86
Fuel sales	16,814.68			16,814.68		16,814.68
Subtotal, basic user income	238,192.54	186,942.13	52,277.16	477,411.83		477,411.83
Total revenues	258,546.22	373,796.80	66,137.05	698,480.07	19,962.50	718,442.57
Cash profit	60,353.19	80,240.42	25,047.56	165,641.17		

Computation of net profit

	Landing area	Terminal building and area	Rented building and area	Total operating
Total cash expenses	$198,193.03	$293,556.38	$41,089.49	$532,838.90
Depreciation	63,174.01	24,263.92	26,715.78	114,153.71
Total expenses	261,367.04	317,820.30	67,805.27	646,992.61
Less satellite income	20,353.68	186,854.67	13,859.89	221,068.24
Expenses chargeable to basic users	241,073.36	130,965.63	53,945.38	425,924.37
Basic user income	238,192.54	186,942.13	52,277.16	477,411.83
Net profit (loss)	(2,820.82)	55,976.50	(1,668.22)	51,487.46
Bond interest expense	63,861.25	89,143.61	8,098.89	161,103.75
Net (loss) after depreciation and bond interest expense	(66,682.07)	(33,167.11)	(9,767.11)	(109,616.29)

NEW ORLEANS AVIATION BOARD, MOISANT INTERNATIONAL AIRPORT

Detail of control accounts—Expenses for the 12 months ending Dec. 31, 1957

Landing area:			
Direct costs:			
Personal services:			
Supervision	$6,380.40		
Field maintenance	53,587.28		
Ship cleaning	2,168.51		
		$62,136.19	
Contractual services:			
Utilities purchased	7,597.41		
Land rental	5,093.40		
Operating services	988.80		
		13,679.61	
Supplies and materials: Operating and maintenance supplies		7,620.83	
Special current charges: Uniforms, ramp guards		38.37	
Equipment, special repairs and improvements: Runway marking		3,044.68	
			$86,519.68
Allocated costs:			
Administrative		91,148.80	
General shop and equipment maintenance		19,934.05	
Utility system		590.50	
			111,673.35
			198,193.03
Terminal building and area:			
Direct costs:			
Personal services:			
Supervision	$9,851.68		
Building maintenance	65,479.19		
Janitor and porter services rendered	39,121.96		
		114,452.83	
Contractual services:			
Utilities purchased	16,684.03		
Janitorial services	2,430.53		
Building maintenance services	3,504.27		
		22,618.83	
Supplies and materials:			
Building and area maintenance	4,663.37		
Janitorial supplies	3,555.96		
Repairs to other buildings	618.26		
		8,837.59	
Equipment, special repairs and improvements:			
Repairs to terminal floor	2,775.85		
Miscellaneous repairs	92.98		
		2,868.83	
			148,778.08
Allocated costs:			
Administrative		131,491.28	
General shop and equipment maintenance		2,657.87	
Utility system		10,629.15	
			144,778.30
			293,556.38

Detail of control accounts—Expenses for the 12 months ending Dec. 31, 1957—Continued

Rented buildings and area:			
Direct costs:			
Personal services: Maintenance of hangars		$13,191.98	
Contractual services:			
Utilities purchased	$3,255.99		
Building maintenance services	361.54		
		3,617.53	
Supplies and materials: Maintenance supplies		418.84	
			$17,228.35
Allocated costs:			
Administrative		23,270.62	
Utility system		590.52	
			23,861.14
			41,089.49
Total operating expenses			532,838.90

Detail of secondary cost centers for the 12 months ending Dec. 31, 1957

Administrative:			
Personal services:			
Administrative	$38,936.11		
General office personnel	40,366.23		
Janitor, NOAB office	447.29		
Fire-department maintenance	3,946.31		
Accumulated compensatory time paid	4,643.18		
		$88,339.12	
Contractual services:			
Insurance	6,507.50		
Traveling expenses	2,613.76		
Policemen	15,517.50		
Fire-department salaries and services	61,120.86		
Professional services	31,364.63		
Dues, subscriptions and publications	1,583.62		
Entertaining	759.00		
Telephone and telegrams	3,847.35		
General services (machines, advertising)	3,583.49		
		126,897.71	
Supplies and materials:			
Office supplies	2,699.14		
Medical supplies	27.21		
Fire-department supplies	3,186.19		
Miscellaneous	159.75		
		6,072.29	
Special current charges:			
Workmen's compensation insurance	3,636.00		
Employees' retirement and social-security contribution	20,000.00		
Policemen's uniform	117.04		
Miscellaneous	537.53		
		24,290.57	
Equipment, special repairs and improvements:			
Improvements to city-hall office	277.11		
Miscellaneous	33.90		
		311.01	
			$245,910.70
Total cost allocated to—			
Landing area			91,148.80
Terminal building and area			131,491.28
Rented buildings and area			23,270.62
			245,910.70
General shop, equipment, maintenance, and operations:			
Personal services: Mechanic and repairmen		$10,591.09	
Contractual services:			
Insurance, vehicles	$501.47		
Repair services to vehicles	65.14		
		566.61	
Supplies and materials:			
Maintenance of vehicles	4,818.64		
Gas and oil	3,009.06		
General shop-operating supplies	3,554.05		
		11,381.75	
Equipment, special repairs, and improvements: Repairs to maintenance office		52.47	
			22,591.92
Total cost allocated to—			
Landing area			19,934.05
Terminal building and area			2,657.87
			22,591.92

Detail of secondary cost centers for the 12 months ending Dec. 31, 1957—Con.

Utility system:			
Personal services: Maintenance and operation		$8,950.49	
Contractual services: Sprinkler system services		637.69	
Supplies and materials: Sewage system maintenance		1,321.99	
Equipment, special repairs, and improvements: Engineering services, rehabilitation pumphouse		900.00	
			$11,810.17
Total cost allocated to—			
Landing area			590.50
Terminal building and area			10,629.15
Rented buildings and area			590.52
			11,810.17

Detail of control accounts—Revenues for the 12 months ending Dec. 31, 1957

Landing area:			
Basic user income:			
Space rentals: Petroleum companies		$6,000.00	
Landing fees:			
Scheduled airlines	$184,413.02		
Scheduled airlines, parking	2,295.99		
Nonscheduled and itinerant	21,627.35		
Nonscheduled and itinerant parking	7,041.50		
		215,377.86	
Fuel sales: Petroleum companies		16,814.68	
			$238,192.54
Satellite income:			
Reimbursed expenses:			
Sale of utilities	$8,841.41		
Miscellaneous	459.73		
		9,301.14	
Concessions: Catering meals		7,451.20	
Ground rentals: Agriculture		345.50	
Management sales and services:			
Airline ship cleaning	$3,147.84		
Itinerant ship cleaning	108.00		
		3,255.84	
			20,353.68
			258,546.22
Terminal building and area:			
Basic user income:			
Space rentals:			
Airlines	45,439.67		
Government agencies	6,130.31		
Insurance, parking, and car rental companies' minimum rental	86,591.96		
Others (including Dobbs operations)	44,554.39		
Adjacent buildings	4,225.80		
		186,942.13	
Satellite income:			186,942.13
Coin machines:			
Pinball	2,870.50		
Restroom locks	10,640.14		
Telephone and telegraph	4,890.30		
Scale	68.17		
Relaxalators	165.53		
Perfume and miscellaneous	37.84		
		18,672.48	
Reimbursed expenses:			
Sale of utilities	17,234.77		
Miscellaneous	655.82		
Contract work	5,955.20		
		23,845.79	
Concessions:			
Car rental, insurance, and parking companies in excess of minimum rental	54,012.17		
Others	1,240.94		
		55,253.11	
Advertising: Signs		960.00	
Ground transportation:			
Limousine and taxi	$40,068.09		
Bus	520.00		
		40,588.09	
Management sales and services:			
Janitor service:			
Airlines	5,519.00		
Government agencies	895.32		
Others	970.00		
Porter service:			
Airlines	40,023.38		
Itinerants	127.50		
		47,535.20	
			186,854.67
			373,796.80

Detail of control accounts—Revenues for the 12 months ending Dec. 31, 1957—Continued

Rented buildings and area:			
Basic user income:			
Space rentals:			
Hangars B and C, airlines	$51,557.16		
Hangar B, Freight Co	720.00		
		$52,277.16	
			$52,277.16
Satellite income:			
Reimbursed expenses:			
Sale of utilities	3,789.15		
Miscellaneous	114.66		
		3,903.81	
Ground rentals: Unimproved ground		7,256.08	
Management sales and services: Sale of janitor services		2,700.00	
			13,859.89
			66,137.05
Total operating income			698,480.07

(*f*)

CITY OF PHILADELPHIA, PHILADELPHIA INTERNATIONAL AIRPORT AND NORTH PHILADELPHIA AIRPORT

EXHIBIT 111-A-9a.—*Statement of revenues and expenses, accrual basis for the year 1957*

	International	North Philadelphia	Combined
Operating revenues:			
Rentals	$589,592.66	$13,694.94	$603,287.60
Landing fees	435,354.21	532.20	435,886.41
Fixed-base operators' fees	18,000.00	4,800.00	22,800.00
Consumer services by concession	592,257.98	5,697.21	597,955.19
Utilities services billed	96,322.69	3,433.39	99,756.08
Airport-operated consumer services	58,192.44	214.84	58,407.28
Other	11,330.63	3,854.22	15,184.85
Total operating revenues (schedule 111-A-9b)	1,801,050.61	32,226.80	1,833,277.41
Operating expenses:			
Landing area	111,693.10	184,512.41	296,205.51
Hangar area	2,522.59	2,601.06	5,123.65
Terminal building area	382,582.42	51,174.09	433,756.51
Management sales and service	12,035.31	1,060.53	13,095.84
Other areas and buildings	54,239.81	2,059.98	56,299.79
Administrative expenses	299,684.41	20,202.26	319,886.67
Total operating expenses	862,757.64	261,610.33	1,124,367.97
General expenses:			
Interest on bonded debt	739,783.20	143,176.80	882,960.00
Real-estate taxes, Tinicum Township, Delaware County	42,460.71		42,460.71
Depreciation and amortization	694,520.01	42,862.62	737,382.63
Total operating and general expenses (schedule 111-A-9b)	2,339,521.56	447,649.75	2,787,171.31
Net loss for the year (schedule 111-A-9b)	538,470.95	415,422.95	953,893.90

(g)

COUNTY OF ALLEGHENY, DEPARTMENT OF AVIATION, GREATER PITTSBURGH AIRPORT

Statement of revenue and expense, year 1957

Particulars	This year	Last year	Increase (decrease)
Revenue:			
Landing fees	$514,024	$396,305	$117,719
Ramp-service fees	40,429	34,652	5,777
Storage and parking fees	5,000	5,698	(698)
Other contract fees	142,949	128,372	14,577
Rentals	312,583	268,051	44,532
Concessions	1,038,474	837,665	200,809
Utilities and supplies	94,510	87,413	7,097
Contract-service fees	5,301	4,725	576
Rentals, dwellings	2,510	2,070	440
Miscellaneous	540	1,173	(633)
Total	2,156,320	1,766,124	390,196
Operating expense:			
Salaries	235,278	224,462	10,816
Wages	352,610	314,089	38,521
Miscellaneous services	216,530	212,232	4,298
Supplies	29,310	24,779	4,531
Materials	21,910	18,386	3,524
Repairs	3,641	1,953	1,688
Equipment	4,912	5,137	(225)
Improvement schedule	87,239	80,868	6,371
Charges to or from inventories	(124)	(2,624)	2,500
Total	951,306	879,282	72,024
Balance from operations, favorable	1,205,014	886,842	318,172
Other income, miscellaneous	660	662	(2)
Total	1,205,674	887,504	318,170
Fixed charges:			
Average annual bond interest	249,645	231,631	18,014
Average annual capital-cost charge	617,633	575,160	42,473
Total	867,278	806,791	60,487
Balance applied to deficit of prior years (deficit deferred)	338,396	80,713	257,683

(*h*)

Profit-and-loss statement, Lambert-St. Louis Municipal Airport, April 1956 through March 1957

Airfield area:	
Revenues	$266, 199. 86
Expenses	108, 517. 10
Operating profit	157, 682. 76
Depreciation, city-acquired assets	163, 195. 49
Net loss	(5, 512. 73)
Depreciation, contributed assets	(128, 143. 17)
Net loss overall	(133, 655. 90)
Old terminal-building area:	
Revenues	20, 416. 12
Expenses	47, 267. 67
Operating loss	(26, 851. 55)
Depreciation, city-acquired assets	14, 947. 97
Net loss	(41, 799. 52)
Depreciation, contributed assets	735. 44
Net loss overall	(42, 534. 96)
New terminal-building area:	
Revenues	799, 928. 53
Expenses	512, 620. 63
Operating profit	287, 307. 90
Depreciation, city-acquired assets	158, 356. 66
Net profit	128, 951. 24
Depreciation, contributed assets	1, 081. 24
Net profit overall	127, 870. 00
Hangars and other buildings area:	
Revenues	152, 477. 30
Expenses	26, 081. 48
Operating profit	126, 395. 82
Depreciation, city-acquired assets	74, 138. 06
Net profit	52, 257. 76
Depreciation, contributed assets	5, 118. 39
Net profit overall	47, 139. 37

Profit-and-loss statement, Lambert-St. Louis Municipal Airport, April 1956 through March 1957—Continued

Other areas:	
Revenues	$9,650.80
Expenses	7,071.60
Operating profit	2,579.20
Depreciation, city-acquired assets	8,842.94
Net loss	(6,263.74)
Depreciation, contributed assets	2,686.37
Net loss overall	(8,950.11)
Total airport:	
Revenues	1,248,672.61
Expenses	701,558.48
Operating profit	547,114.13
Depreciation, city-acquired assets	419,481.12
Net profit	127,633.01
Depreciation, contributed assets	137,764.61
Net loss overall	(10,131.60)

NOTE.—Loss in parentheses.

(*i*)

DEPARTMENT OF PORT CONTROL, DIVISION OF AIRPORTS, CLEVELAND HOPKINS AIRPORT, CLEVELAND, OHIO

Income and expense, Jan. 1–Dec. 31, 1957

	1956 total	1957 total	Increase or decrease
Income:			
Scheduled airlines	$475,879.07	$505,196.23	$29,317.16
Other aeronautical	120,107.41	128,228.52	8,121.11
Consumer services and miscellaneous	702,588.31	823,034.82	120,446.51
Total	1,298,574.79	1,456,459.57	157,884.78
Operating expenses:			
Salaries and wages	262,995.14		
Supplies	7,634.37		
Utilities	85,901.16		
Maintenance labor	117,748.59		
Equipment time	42,026.21		
Maintenance material	31,428.25		
		547,733.72	
Other expenses:			
Insurance	1,333.80		
Workmen's compensation	3,497.32		
Retirement fund	19,695.76		
		24,526.88	
Total operating expense		572,260.60	
Gross profit from operations			884,198.97
Administrative		92,343.34	
Total expense		664,603.94	
Net profit			791,855.63
Depreciation	513,078.76		
Interest on debt	226,050.91		
Loss on sale of fixed assets	5,805.71		
		744,935.38	
Net profit after adjustment			46,920.25

(*j*)

MINNEAPOLIS-ST. PAUL METROPOLITAN AIRPORTS COMMISSION

Series V and VI prospectus

Year	Revenue	Operating expenses	Capital expenditures	Debt service	Net requirement
1943		$18,142.23			$18,142.23
1944	$45,177.40	56,844.90	$3,028.41		14,095.91
1945	220,767.99	[1] 178,252.90 315,324.24	12,966.25		272,775.40
1946	401,043.52	[1] 79,030.19 490,512.01	155,334.30		323,832.98
1947	481,267.61	[1] 37,322.89 592,186.83	266,800.96		415,043.07
1948	568,143.46	663,995.92	553,527.60	$82,579.60	731,959.66
1949	663,952.03	779,234.14	1,637,362.30	133,875.00	1,886,519.41
1950	753,065.28	947,869.80	2,510,257.23	243,375.00	2,948,436.75
1951	835,939.32	1,117,373.82	1,814,900.53	237,375.00	2,333,710.03
1952	962,504.16	1,194,332.94	1,152,790.80	241,475.00	1,626,094.58
1953	1,095,444.65	1,266,714.39	178,573.25	235,300.00	585,142.99
1954	1,746,032.17	1,316,562.16	612,217.96	247,125.00	1,029,872.75
1955	1,292,175.45	1,406,848.29	837,210.72	256,362.50	1,208,246.06
1956	1,375,186.30	1,525,537.05	849,997.86	267,100.00	1,267,453.61
Total	9,841,294.34	11,973,084.70	10,584,967.97	1,944,567.10	[2] 14,661,325.43

[1] Engineering, planning, survey, and aerial photo of metropolitan area.
[2] Includes $4,191,583.05 of State and Federal aid.

NOTE.—Due to expanded program, it is estimated that our net requirement will be approximately 3 times as great as in recent years.

(*k*)

CITY OF HOUSTON, TEX.
April 25, 1958.

Mr. A. E. DYATT,
Civil Aeronautics Association,
Fort Worth, Tex.

DEAR MR. DYATT: As per your telephone request of yesterday, I hand you herewith the information concerning our municipal airport:

City of Houston Municipal Airport, 1957:

Revenue	$861,633.48
Expense	374,424.50
Net revenue	487,208.98

Debt service for 1957:

Principal	414,000.00
Interest	174,362.50
Total	588,362.50

I think that I should advise you that the entire airport debt is all city of Houston general obligation bonds, and not revenue bonds.

If I can be of any further service to you, please do not hesitate to call upon me at any time.

Very truly yours,

ROY B. OAKES, *City Controller.*

(1)

DEPARTMENT OF AIRPORTS,
CITY OF LOS ANGELES, CALIF.
April 29, 1958

CIVIL AERONAUTICS ADMINISTRATION,
Los Angeles, Calif.

(Attention: Mr. Charles J. Winger, Chief, Airports Division.)

GENTLEMEN: In answer to your request for a profit and loss statement for Los Angeles International Airport, the following information is submitted for the fiscal year ended June 30, 1957:

Operating revenues		$3,307,086
Operating expense	$771,980	
Depreciation	521,599	
Bond redemption and interest	1,070,368	
Total expense		2,363,947
Excess, revenues over expenses		943,139

Estimated operating statement for 1957–58

Operating revenues		$3,512,719
Operating expenses	$855,023	
Depreciation	575,000	
Bond redemption and interest	1,238,900	
Total expense		2,668,923
Excess, revenues over expenses		843,796

May we call your attention to the fact that in June 1956 the voters approved a bond issue in the amount of $59,700,000—some $49,700,000 of which was proposed for new runways, taxiways, a complete new terminal area, capable of handling up to 14 million passengers a year, and necessary land acquisition for Los Angeles International Airport, and the remaining $10 million for land and improvements at the Van Nuys Airport.

At this same election the city charter was amended to provide that all revenues in excess of actual operating expenses and the purchase of necessary equipment items must be paid for the interest and redemption of the bonds authorized and to repay to the proper city funds all principal and interest on some $16 million of airport bonds previously issued.

The amount to be so repaid approximates $17,071,978. Some $23 million of the bonds authorized in 1956 have been issued, with the remaining amount expected to be completely sold as needed by February 1959. Principal and interest on these bonds must be met out of airport revenues. For this purpose the 1958–59 budget will contain a bond redemption and interest item of $2,059,750. This amount will increase annually to a high of approximately $3,465,000 for the 1961–62 fiscal year.

As the completion of the new terminal facilities, with its resultant increase in revenues, will not occur until some time in 1961, the operating statement of Los Angeles International Airport will show very substantial losses for all future years until approximately 1963–64.

It should be noted that within the next 1½ years, Los Angeles International Airport will contract for over $43,600,000 in construction and land acquisition. Allocations of Federal funds for 1957–58 and 1958–59 total $2,250,000 or only 5.16 percent Federal participation as compared with an authorized 54.04 percent or $23,561,000 of Federal funds.

Additional Federal aid is most urgent at this time to enable complete development of vitally necessary facilities and to forestall probable cutbacks in planned construction due to lack of funds.

Very truly yours,

ROBERT A. MCMILLAN, *General Manager.*

(*m*)

AIRPORT DEPARTMENT, SAN FRANCISCO INTERNATIONAL AIRPORT, SAN MATEO COUNTY

Supplement to 1956–57 profit-and-loss statement showing effect of bond redemption program when substituted for depreciation expense

	Fiscal year ending—	
	June 30, 1957	June 30, 1956
Net profit	$277,006.65	$10,721.85
Add back depreciation expense	1,034,550.22	1,029,908.17
Total	1,311,556.87	1,040,630.02
Bond redemptions	2,379,000.00	2,129,000.00
Net deficit balance	1,067,443.13	1,088,369.98

Statement of income and expense years ended June 30, 1957, and June 30, 1956

	June 30, 1957	June 30, 1956
Operating revenues:		
Air carrier flight operations:		
Scheduled	$481,950.75	$446,448.09
Scheduled feeder lines	25,160.95	22,831.70
Nonscheduled	17,205.07	11,209.90
Total air carrier flight operations	524,316.77	480,489.69
Rentals:		
Ramp area	15,861.60	15,861.60
Aircraft outdoor storage	10,159.54	13,780.25
Airport property:		
Unimproved and paved	105,273.44	94,578.61
Expansion area	6,907.09	7,571.91
Hangars:		
Entire hangars	35,117.52	30,799.55
Partial hangars		6,108.34
Passenger terminal building and airmail and cargo building office space	669,169.24	638,427.48
Other buildings and structures	66,834.38	37,161.13
Total rentals	909,322.81	853,288.87
Bulk petroleum deliveries:		
Professional fire service	44,741.14	36,772.36
Rental of tank farm area	10,836.88	9,118.78
Wharfage charges	41,202.77	30,199.37
Pipeline licenses	300.00	525.00
Total bulk petroleum deliveries	97,080.79	76,615.51
Services, sales, commissions and permits:		
Public address system	16,683.41	14,142.36
Restaurant and allied services	323,244.44	284,173.48
Newspaper and tobacco counters	56,688.49	49,213.41
Taxicab and limousine permits	150,807.24	135,787.94
Parking lot (includes parking meters)	452,432.83	368,536.62
U-drive	241,907.38	148,716.19
Telephone commissions	17,635.81	14,320.33
Travel agency, air service and sales	0	46.85
Telegraph commissions	0	600.00
Insurance vending machines	4,800.00	10,909.68
Sale of petroleum products	10,937.76	45,847.42
Shoeshine stands	3,889.07	3,712.30
Vending and weighing machines	565.70	472.81
Baggage locker commissions	11,617.60	9,583.71
Restrooms	16,199.71	14,423.72
Automobile service station	17,702.65	15,780.09
Public stenographer	0	213.60
Florist	3,286.94	3,259.04

Statement of income and expense years ended June 30, 1957, and June 30, 1956—Continued

		June 30, 1957	June 30, 1956
Operating revenues—Continued			
Services, sales, commissions and permits:			
Gift shop		$26,812.83	$24,907.05
Advertising displays		26,381.50	14,485.25
Childrens' merry-go-rounds		771.43	775.04
Candy shop		2,173.87	2,057.81
Book shop		4,680.17	4,507.23
Photography		1,720.56	1,287.94
Barber shop		3,263.87	3,224.83
Telescopes		313.65	294.43
Porter service		3,000.00	3,000.00
Telo-Tronics agency		834.48	546.24
Beauty shop		1,900.00	0
Total services, sales, commissions and permits		1,400,251.39	1,174,825.37
Total operating revenues		2,930,971.76	2,585,219.44
Operating expenses:			
Salaries and wages:			
General and administrative		50,354.94	46,817.66
Maintenance and operations		769,896.45	695,749.53
Total salaries and wages		820,251.39	742,567.19
Other costs of operations:			
Travel expense (business trips)		5,506.12	4,427.02
Travel expense and local fares		266.96	9.75
Employee transportation expense		17,872.20	18,090.00
Freight, express, and drayage		240.09	477.21
Use of employees' cars, mileage only		20.26	19.28
Storage and care of vehicles		46.65	48.65
Maintenance and care of office equipment		375.89	741.24
Maintenance and care of other equipment		221.48	434.93
Heat, light, power, water		89,638.86	73,067.75
Telephone and telegraph	$34,363.66		
Less: Extension service charged to tenants	22,989.13		
		11,374.53	11,382.38
Postage		671.49	662.31
Printing, advertising, etc		1,749.79	3,405.64
Newspapers and periodicals		684.15	528.95
Janitorial and window washing services:			
Contractual		4,068.00	5,532.81
Refuse disposal		0	440.68
Rentals of office furniture and equipment		75.00	305.00
Professional and special services		48,114.25	39,704.62
Celebrations (flight festival)		0	1,053.19
Miscellaneous contractual services		891.61	1,208.68
Operating material and supplies		8,081.56	17,033.07
PUC, general office expense		25,551.55	24,883.47
Fire-fighting expense		212,432.33	198,233.68
Purchasing department expense		3,833.84	3,636.80
Towel service		195.85	139.88
Total other costs of operation		431,912.46	405,466.99
Other costs of maintenance and repair:			
Landing area		0	201.01
Runways		35,530.79	24,427.94
Field lighting equipment		675.11	1,365.47
Radio equipment		1,751.29	1,854.80
Hangars		0	86.20
Administration building		39,923.14	25,271.23
Other buildings		4,433.66	2,284.14
Automotive equipment		21,845.17	4,203.04
Other equipment facilities		11,845.17	7,667.10
Parking areas, roads, walks, fences, etc		1,180.77	7,914.05
Power distribution system		11,965.57	2,239.35
Total other costs of maintenance and repair		128,960.98	77,514.33
Fixed charges:			
Accident compensation, employees		4,267.55	668.80
Automobile insurance		2,298.74	1,977.81
Other insurance		14,120.66	14,507.03
Pension and retirement allowance		101,613.51	90,299.17
Taxes paid	$71,573.65		
Less charged to tenants	8,480.31		
		63,093.34	62,342.57

Statement of income and expense years ended June 30, 1957, and June 30, 1956—Continued

		June 30, 1957	June 30, 1956
Operating expenses—Continued			
Fixed charges—Continued			
Depreciation		$1,034,550.22	$1,029,908.17
Doubtful accounts		4,800.00	4,800.00
Membership dues		1,035.00	1,035.00
Awards, indemnities, damages, and judgments		3,758.25	0
Total fixed charges		1,229,537.27	1,205,538.55
Total operating expenses		2,610,662.10	2,431,087.06
Operating profit		320,309.66	154,132.38
Other income:			
Resale of electric energy	$349,161.58		
Less cost thereof	224,014.22		
		125,147.36	101,603.76
Resale of water	55,363.35		
Less cost thereof	51,773.11		
		3,590.24	4,135.18
Sale of steam		[1] 4,756.27	[1] 4,463.74
Sewage disposal		[1] 16,259.09	[1] 1,532.77
Miscellaneous		3,380.26	2,824.83
Total other income		153,133.22	114,560.28
Subtotal		473,442.88	268,692.66
Other expenses:			
1945 and 1949 airport bond interest expense		138,540.00	168,796.86
Miscellaneous additions to and deductions from income, net deduction (schedule C–1)		57,896.23	89,173.95
Total other expense		196,436.23	257,970.81
Net profit		277,006.65	10,721.85

[1] Cost of these items is incidental to the production for airport general use. No breakdown of unit costs is available.

NOTE.—The accompanying notes to financial statements are an integral part of this statement of income and expense.

EXHIBIT 4A

STATEMENT OF HON. LOUIS S. ROTHSCHILD, UNDER SECRETARY OF COMMERCE FOR TRANSPORTATION, BEFORE THE HOUSE INTERSTATE AND FOREIGN COMMERCE COMMITTEE, ON H. R. 11566

Mr. Chairman, members of the subcommittee, I am here, in response to your invitation, to present the views of the Department of Commerce on a group of bills which propose to extend the Government's financial contribution to the construction and development of civil airports owned by our States and localities. Appearing with me this morning is Mr. James T. Pyle, the Administrator of Civil Aeronautics. We are opposed to enactment of these bills.

The Federal Airport Act as originally passed in 1946 provided that the Government financial contribution to airport construction and development was to expire by June 30, 1953. As a result of subsequent amendment, the Federal Airport Act is not due to expire until June 30, 1959, about a year from now. This act as it now stands authorizes the Secretary of Commerce to obligate $63 million for the fiscal year ending June 30, 1959, as the Federal Government's share of the cost of local civil airport construction. This amount when added to the sums previously authorized to be obligated and not yet spent, will result in a total of over $120 million still to be spent by the Federal Government as its share of the cost of construction of civil airports owned and operated by our States and localities. S. 3502 and H. R. 11566, would extend the duration of the Federal Airport Act to June 30, 1963. These bills would increase the obligational authority for airport aid from $63 million to $175 million for the fiscal year ending June 30, 1959, and would provide authority to obligate $100 million for each fiscal year thereafter. Thus, the additional amount to be obligated and paid by the Federal Government for civil airport construction would come to a total of over $500 million by the terms of these bills.

H. R. 10972, 11091, and 11619, the remaining bills which you are considering at this time, would extend the Airport Act to 1963 and would authorize the obligation of $63 million a year for an additional 4 years or a total additional expenditure of $252 million.

Since the enactment of the Federal Airport Act in 1946, the Government has spent, allocated or obligated, about $400 million for the development of civil airports. Prior to enactment of this law, the Government spent the additional sum of approximately $700 million under various programs, for the same purpose.

In addition to these purely civil expenditures, there has been an approximately equal amount of expenditure by the military agencies upon airport facilities which have been contributed to the civil airport system. The Federal Government, therefore, has in years past contributed over $2 billion to the development of our network of locally owned public airports.

The Federal Government's financial contribution to the development of our civil aviation has not by any means been limited to airports. Millions of dollars have been paid in subsidies to assure the profitable development of our civil air carriers. These subsidies continue, the greater part now going to the local service carriers who provide air service to our smaller communities. The greater expenditure by far, however, must go to the necessary operation, expansion, and improvement of our air traffic control system. The urgent needs of this system will require us to spend a total of up to approximately $3 billion during the 5 fiscal years from 1959 through 1963. The compelling need for these expenditures does not, I am sure, have to be justified to this group.

In considering the advisability of supporting or opposing enactment of the bills which are before you, we have had to come face to face with some very hard facts. The necessary expenditures by the Federal Government, airports aside, to assure the continued development and increased safety of civil aviation will be tremendous. There is no immediate prospect that this sum can or should be reduced. We realize this all too well. We must also realize that the Government has other, even more pressing, obligations which must be met. With this in mind we have proposed to Congress a program of user charges to help pay part of the cost of the air traffic control system.

The airway user charge program is designed to recover only part of the cost of operation and maintenance of this system. Even with this program we will still have to look to the Federal Government for all of the large additional sums which will be required to finance necessary research and construction to meet the expanding needs of our air traffic system.

The sums which will be needed to finance the costs of constructing these navigation aids, paying the personnel to operate and maintain them, and paying for the research facilities needed to assure that the system will keep up with the growing needs of civil aviation, all this will have to be obtained each year from Congress in the course of normal appropriation procedure. These demands will have to be weighed in the light of then existing obligations which the Federal Government will have to meet—not just the needs of civil aviation alone—but all of the other urgent obligations which this Government has to meet in these perilous times.

The bills which are before you do not leave room for appropriation discretion whatever be the urgent necessities which may arise. We are here considering, in effect, both the authorization and the appropriation of funds for civil airport development. If the Congress should feel the need to exercise any discretion with regard to the sums which ought to be appropriated for civil aviation in the future, enactment of any of these bills would mean that discretion would have to be exercised in other areas. The greatest area for appropriation discretion with respect to civil aviation which would remain would be in connection with funds which may be needed for the air traffic control system.

The question we face is whether we can and should impose the cost of civil airport construction upon the Federal Government as an expanding and more or less permanent obligation. We believe that other answers can be found besides the easy one of asking the Federal Government to add this enlarged cost to its already substantial contribution to civil aviation in other areas, such as navigation facilities and air carrier subsidy.

Even though the Federal Government has made significant contributions to the cost of civil airport construction in past years and will continue to do so for some years in the future under existing legislation, our civil airports have been essentially a local responsibility. Our States and communities have been responsible for building, maintaining, and operating the airports serving their

needs. The Federal Government, as you know, owns and operates only one civil airport in the continental United States and is now building another one to serve our Capital City.

Airports are, after all, community assets. They attract business and make possible increased tax income to the communities they serve. Airports are also business enterprises. They serve commercial air carriers, business and private fliers. These people are expected to, and should pay for the services which the airport provides them. Space is available to concessionaires who provide services required by the airport users and also contribute to the cost of operating the airport. All of this income and financial benefit accrues directly to the localities which our airports serve. Air transportation is growing and with it should grow the income from airport operations. We are no longer at the stage we were in 1946 when the Airport Act became law. Airports have come a long way toward self-sufficiency. We expect that in the future they will continue this advance toward even more substantial economic stability.

More and more communities are finding sources other than Federal aid through which to finance economically necessary and desirable airport development. More and more the users of airports are expanding their contribution to such development by lease, construction, and other arrangements by which the airport facilities they need are built and maintained. We believe this trend should be and will continue to be encouraged in the future as civil aviation grows. This is the soundest way to assure that airport development will result from the stimulus of actual economic need and benefit. It is in this way that we will best assure the development of airports as they are needed, when they are needed, and to the extent they are needed. We believe it is time for the Federal Government to be able to look to curtailment of its contributions to airport development and improvement, rather than expansion of its spending in this area.

One thing I believe ought to be made clear; if the bills which are before you are not enacted at this time, it will not mean the end of Federal airport aid. We still have available for obligation and expenditure, under the Federal Airport Act, a total sum in excess of $120 million. This amount may not seem adequate to many who would like to see even greater participation by the Federal Government in local airport development projects. We would hesitate to consider $120 million to be an inconsequential sum of money even in these times.

There is less reason than ever for enacting any of these bills at this time. When we testified before the Senate our fiscal situation was serious but there was still some reason to hope for the possibility of a balanced budget. Conditions have changed radically since that time. We now face the prospect of a substantial Federal deficit. Our troops have landed in the Middle East. This Government faces the urgent necessity of meeting obligations which go to the very survival of our Nation and the free world. We cannot reasonably forecast the cost of meeting the obligations for our Nation's defense beyond the certainty that they will be substantial. Under these circumstances we seriously doubt the wisdom of imposing upon the Federal budget the considerable additional spending which these bills would require.

Section 6 of S. 3502 would also amend section 2 (a), paragraph (3), of the Federal Airport Act to include within the meaning of the term "airport development," periodic seal coating of flexible airport pavements and the filling of joints in rigid airport pavements. The proposal would, in effect, make such work eligible for Federal airport aid.

Under the act as originally written and in its present form, there may be included in projects under grant agreements only such work on airports as constitutes construction, improvement or repair as distinguished from maintenance. Further, section 11 of the act, by providing that, as a condition precedent to his approval of a project, the Secretary of Commerce shall receive assurances that the airport and all facilities thereon or connected therewith will be suitably maintained, indicates an intent that the grants be conditioned on the sponsor's assuming the responsibility for all maintenance costs.

The established policy of the Department set forth in the Regulations of the Administrator governing the Federal airport program is that, except in certain limited instances, seal coating and filling of joints, although highly desirable, do not constitute airport improvement, development or repair, but are maintenance work. Consequently, since in accepting Federal funds, the sponsor in his grant agreement undertook the sole responsibility for performance of

maintenance, it is the position of the Department that seal coating and refilling of joints, because it is ordinarily maintenance, is not eligible for Federal aid.

In the early stages of the airport program there was a period during which resealing and filling of joints were treated in divergent ways. This was due to the fact that we had no specific criteria by which to classify such work as maintenance, on the one hand, or replacement, repair and improvement on the other. Subsequently, an enginering review of the matter was conducted and definitive standards were issued which prescribed the type of seal coating and filling of joints which is maintenance and that which can be considered replacement, repair or improvement. A regulation setting forth these criteria was developed. However, prior to issuance of the regulation, it was forwarded to the Comptroller General of the United States for his opinion. By his reply dated April 26, 1956, we were advised that the "approvals of grants-in-aid in cases covered by the proposed regulation would appear to be proper and consistent with the controlling intent of Congress." We are satisfied that our present standards correctly describe the difference between that kind of resealing and filling of joints is properly normal maintenance, and that which is actual airport improvement. A copy of our regulation on the subject is attached to this statement.

In view of the foregoing, it is our belief that the enactment of this provision of S. 3502 would be directly contrary to the general principles thus far followed by the Congress and this Department in distinguishing between airport development, the cost of which is eligible for Federal participation, and normal maintenance and operation costs, which are not eligible for Federal aid. Further, we should point out that if resealing and refilling of joints should by congressional action be defined as airport development, we would be placed in a difficult position to object to future proposals to make other normal maintenance items equally eligible for Federal aid. Such a deviation in our opinion would create a dangerous precedent in that it would mean that the Federal Government for the first time would be subsidizing a part of the actual operational cost of airports, thus opening up an entirely new area of Federal participation through grant-in-aid.

We, therefore, believe that enactment of this provision of S. 3502 would be unwise.

The Bureau of the Budget advises us that enactment of any of these bills would not be in accord with the program of the President.

Mr. Pyle and I would be happy to try to answer any questions you may have regarding these bills.

EXHIBIT 4B

STATEMENT OF HON. LOUIS S. ROTHSCHILD, UNDER SECRETARY OF COMMERCE FOR TRANSPORTATION, BEFORE THE AVIATION SUBCOMMITTEE OF THE COMMITTEE ON INTERSTATE AND FOREIGN COMMERCE, UNITED STATES SENATE, APRIL 14, 1958, ON S. 3502

Mr. Chairman, members of the subcommittee, I am pleased to have this opportunity to present the views of the Department of Commerce regarding S. 3502, which proposes to extend the duration, and expand the total amount, of the Federal Government's contribution to the cost of construction of State and local airports.

Unfortunately, the Administrator of Civil Aeronautics, James T. Pyle, had to be out of the city and he is not able to be with me this morning. Mr. Pyle will be available, if the subcommittee should require, at a later date. I do have with me, however, Deputy Administrator of Civil Aeronautics, William B. Davis, and the Director of the Office of Airports, Herbert H. Howell.

We oppose enactment of S. 3502.

The Federal Airport Act is not due to expire until June 30, 1959, more than a year from now. S. 3502 would extend its duration beyond that date to June 30, 1963. The Federal Airport Act now authorizes the Secretary of Commerce to obligate $63 million for the fiscal year ending June 30, 1959, as the Federal Government's share of the cost of local airport construction. S. 3502 would increase this obligational authority to $175 million for the 1959 fiscal year and would provide authority to obligate $100 million for each fiscal year thereafter to June 30, 1963. Thus, the additional amount to be obligated and paid by the Federal Government for airport construction would come to a total of over $500 million by the terms of S. 3502.

Since the enactment of the Federal Airport Act in 1946, the Government has spent, allocated or obligated, about $400 million for the development of civil airports. Prior to enactment of this law, the Government spent the additional sum of approximately $700 million, under various programs, for the same purpose.

In addition to these purely civil expenditures, there has been an approximately equal amount of expenditure by the military agencies upon airport facilities which have been contributed to the civil airport system. The Federal Government, therefore, has in years past contributed over $2 billion to the development of our network of locally owned public airports.

Airports, nevertheless, constitute only a part of the picture of Federal participation in, and financial support of, the development of our civil aviation. Millions of dollars have been paid in subsidies to assure the profitable development of our civil air carriers. These subsidies continue, the greater part now going to the local service carriers who provide air service to our smaller communities. The greater expenditure by far, however, must go to the necessary operation, expansion and improvement of our air traffic-control system. The urgent needs of this system will require us to spend a total of up to approximately $3 billion during the five fiscal years from 1959 through 1963. The compelling need for these expenditures does not, I am sure, have to be justified to this group.

In considering the advisability of supporting or opposing enactment of S. 3502, we have had to come face to face with some very hard facts. The necessary expenditures by the Federal Government, airports aside, to assure the continued development and increased safety of civil aviation will be tremendous. There is no immediate prospect that this sum can or should be reduced. We realize this all too well. We must also realize that the Government has other, even more pressing, obligations which must be met. With this in mind we have proposed to Congress a program of user charges to help pay part of the cost of the air traffic control system.

The airway user charge program is designed to recover only part of the cost of operation and maintenance of this system. We will have to look to the Federal Government for all of the large additional sums which will be required to finance necessary research and construction to meet the expanding needs of the system. S. 3502 will remove the substantial amount proposed for airport development from the area of congressional appropriation scrutiny. If other more urgent needs should intervene in the future, can we expect that Congress will unquestionably provide all of the funds required for both airports and the air traffic control system. With the enactment of S. 3502 the greatest area for appropriation discretion with respect to spending for civil aviation which will remain will be the funds needed for the air traffic control system.

We are faced with the question of whether we can and should impose the cost of airport construction upon the Federal Government as an expanding and more or less permanent obligation. We believe that other answers can be found besides the easy one of asking the Federal Government to add this enlarged cost to its already substantial contribution to civil aviation in other areas, such as navigation facilities and air carrier subsidy.

The construction, maintenance and operation of our civil airports has always been primarily a matter of local responsibility. Airports are community assets. They attract business and make possible increased tax income to the communities they serve. Airports are also business enterprises. They serve commercial air carriers, business and private fliers. These people are expected to, and should pay for the services which the airport provides them. Space is available to concessionaires who provide services required by the airport users and also contribute to the cost of operating the airport. All of this income and financial benefit accrues directly to the local communities which our airports serve. Air transportation is growing and with it should grow the income from airport operations. We are no longer at the stage we were in 1946 when the airport act became law. Airports have come a long way toward self-sufficiency. We expect that in the future they will continue this advance toward even more substantial economic stability.

More and more communities are finding sources other than Federal aid through which to finance economically necessary and desirable airport development. More and more the users of airports are expanding their contribution to such development by lease, construction, and other arrangements by which the airport facilities they need are built and maintained. We believe this trend should be and will continue to be encouraged in the future as civil aviation grows. This

is the soundest way to assure that airport development will result from the stimulus of actual economic need and benefit. It is in this way that we will best assure the development of airports as they are needed, when they are needed, and to the extent they are needed. We believe it is time for the Federal Government to be able to look to curtailment of its contributions to airport development and improvement, rather than expansion of its spending in this area.

One thing I believe ought to be made clear; if S. 3502 is not enacted it will not mean the end of Federal airport aid. We will have available for obligation, under the Federal Airport Act, for fiscal year 1959, the sum of $123.8 million. Of this amount, we expect to have approximately $73 million placed under construction during that year. For fiscal year 1960, there will be available for obligation some $50.6 million and of this amount approximately $26.8 million will be obligated and approximately $66 million in actual payments will be made. In 1961, there will be available for obligation $24 million and it is estimated that $18 million would become obligated that fiscal year and there would be payments made in the amount of $36.6 million for approved expenditures. In 1962, it is estimated that there will be available for obligation the amount of $6 million and we believe that this whole amount will be obligated and there would be a payment of $18 million for accrued obligations. During the fiscal year 1963, it is estimated that there would be $10 million expenditures for accrued obligations and at that time there would remain unliquidated obligations in the sum of $30.5 million.

These amounts may not seem adequate to many who would like to see even greater participation by the Federal Government in local airport development projects. We would hesitate to consider $123.8 million to be an inconsequential sum of money even in these times.

We are continuing, however, to keep the Federal airport program under constant review. It is possible that at some future date a substantial general public works program may be under consideration. In that event, we will of course evaluate the need for expanded Federal airport aid and its position relative to other proposals under consideration at that time.

Mr. Davis, Mr. Howell and I will be happy, to the exent of our ability, to answer any questions you may have. You have also asked that we give our views this morning on S. 1189 and S. 3533. Mr. Howell is prepared to testify regarding these bills.

EXHIBIT 5

UNITED STATES OF AMERICA,
DEPARTMENT OF COMMERCE,
OFFICE OF THE ADMINISTRATOR OF CIVIL AERONAUTICS,
Washington, D. C.

TECHNICAL STANDARD ORDER

TSO–N6b—1958, superseding TSO–N6a, October 4, 1948

Subject: Runway strength and dimensional standards for air carrier operations.

PURPOSE

In order to obtain better correlation between the design of airports and the design of aircraft which are to be used in air carrier operations, the design standards contained herein have been developed by the Civil Aeronautics Administration. It is the purpose of this order to (1) guide employees of the Civil Aeronautics Administration regarding approvals and recommendations for runway design, (2) indicate to sponsors of projects for airport development under the Federal Airport Act the maximum limit of runway characteristics to which Federal funds will be applied, and (3) indicate to manufacturers and operators of transport type aircraft the maximum effective airport runways which normally will be available for present and future aircraft. It is expected that air carrier operators will secure such equipment and establish such procedures that will permit, in accordance with established civil air regulations, approval of operations from runways specified herein.

The effective runway length and pavement strengths in the following table are maximum with each category and are based upon the balanced runway concept. The runway length and strength for a particular location will be determined within the appropriate category based upon the requirements for the specific airport, taking into account the route pattern being flown from the airport and the type of equipment which fly these routes. The dimensions for

runway, taxiway and strip width are fixed criteria which are to be modified only in accordance with conformance requirements set forth herein.

DIRECTIVE

In accordance with the procedure for establishing technical aeronautical standards, specified in administrative order 56 dated August 2, 1946, and standard practice 6370, the "runway strength and dimensional standards for air carrier operations" set forth below are established as a technical standard order.

Air carrier service	Runway		Taxiway width	Landing strip width	Pavement loadings, equivalent single-wheel load
	Length	Width			
	Feet	*Feet*	*Feet*	*Feet*	*Pounds*
Local	[1] 4,200	100	50	400	30,000
Trunk	6,000	150	75	500	60,000
Continental	7,500	150	75	500	75,000
Intercontinental	10,500	150	75	500	100,000

[1] Implementation of an ILS requires a minimum runway length of 5,000 feet. Therefore, where an ILS is programed and the corrected length of the runway to be instrumented is less than 5,000 feet, extension of such runway to an actual length net to exceed 5,000 feet will be eligible for participation under the Federal-aid airport program.

NOTE.—Air carrier services are defined as follows:
Local: Airports to serve on local service routes providing service in the short-haul category normally not exceeding 500 miles.
Trunk: Airports to serve on airline trunk routes and engage in intermediate length hauls normally not exceeding 1,000 miles.
Continental: Airports serving long nonstop flights, exclusive of coast to coast, normally entirely within the confines of the continental United States. These airports serve nonstop flights up to 2,000 miles.
Intercontinental: Airports to serve the longest range nonstop flights in the transcontinental, transoceanic and intercontinental categories.

The air carrier service anticipated in the immediate future and that expected ultimately for each airport location will be determined by the Office of Airports.

SPECIFIC INSTRUCTIONS

Runway length.—The runway lengths shown have been established for standard temperature (59° F.) plus 41° F., sea level elevation and no gradient.

Runway length will be increased for airport elevation at the rate of 7 percent for each 1,000 feet of elevation above sea level. In the event of runway gradient, the runway length established for altitude will be increased at the rate of 20 percent for each 1 percent of effective runway gradient. The effective gradient will be determined by dividing the maximum difference in runway center line elevation by the total length of the runway. The effective gradient shall not exceed 1 percent nor shall the maximum grade of any portion of the runway exceed 1½ percent.

Landing strip.—For the purpose of this order, "landing strip" is defined as the graded area upon which the longitudinal axis of the runway is centrally located and extends at least 100 feet beyond either end of the runway.

Maximum pavement loading.—The equivalent single wheel load strengths in the foregoing table represent the maximum for the different categories of airports, taking into consideration the varying foundation conditions which can exist. The specific pavement strength for a particular airport shall be fixed on the basis of the principles and criteria set forth in the CAA manual, "Airport Paving."

Conformance requirements.—Runways, taxiways, and landing strips not conforming to this order which are built without Federal-aid airport program funds shall not affect approval or the use of Federal-aid airport program funds on other construction on the same airport. However, Federal-aid airport program funds where used for the items covered in this order may be applied only to that portion of the work not exceeding the standards of this order, except as noted below:

1. In cases where there is contemplated improvement and extension of runways, landing strips and/or taxiways developed to greater widths under prior criteria, the widths in excess of those shown herein will be

retained and extended only when it is determined that this is the most practicable, economical and desirable procedure.

2. With respect to the runway, taxiway, and landing strip widths of local and trunk service type airports which have been constructed to a previous standard of lesser dimension than that indicated in this order, development to widths as herein indicated will be required only if specific study indicates the necessity or desirability for such widening.

Application of the clearway concept to this technical standard order for turbine-powered aircraft.—Where it can be shown that economies will result without sacrificing the safety of operations, the clearway principle, as described in special civil air regulation SR–422A issued by the Civil Aeronautics Board, may be applied in determining length of runways for turbine-powered aircraft. Under such conditions, it will be the responsibility of the airport controlling authority to ascertain the runway and clearway lengths applicable to the particular site.

The clearway shall be an area beyond and contiguous to the landing strip, not less than 300 feet on either side of the extended center line of the runway, at an elevation no higher than the elevation at the end of the runway, clear of all fixed obstacles, and under the control of the airport authorities.

Where the clearway concept is employed, the runway length shall be the greater of the two lengths established in accordance with (*a*) or (*b*) below, but in no case greater than the paved runway lengths shown in foregoing table:

(*a*) The takeoff run as defined in SR–422A, special civil air regulation.

(*b*) The accelerate stop distance as defined in SR–422A, special civil air regulation.

No clearway shall have a length greater than one-half of the takeoff run as defined above.

EXHIBIT 6

AIR TRANSPORT ASSOCIATION OF AMERICA,
Washington, D. C., July 29, 1958.

Mr. JOHN A. BLATNIK,
Chairman, House Legal and Monetary Affairs Subcommittee,
Washington, D. C.

DEAR CHAIRMAN BLATNIK: During the hearings of the Legal and Monetary Affairs Subcommittee of the House Government Operations Committee this morning, the Air Transport Association was requested to furnish additional information on two subjects.

The first subject was related to the Weather Bureau program of weather reporting stations throughout the United States. We indicated that weather observations were taken, in addition to the Weather Bureau, by the airlines, the Air Force, Navy, Army, and CAA Air Traffic Communications Stations (ATCS) (Formerly called INSACS).

The committee asked that we furnish information about the other weather observation stations that were operated by agencies other than the Weather Bureau. In response to this request, there are enclosed three copies of a tabulation which was prepared in connection with the hearings relative to the Weather Bureau before the House Appropriations Committee.

The column near the top of the page headed "WBAS" are those stations operated by the Weather Bureau. These letters stand for "Weather Bureau airport stations."

The observations made by the CAA are shown on the bottom of the page headed "CAA".

The stations operated by the airlines are those shown in the column headed "SAWRS." These initials stand for "Supplementary airport weather reporting service".

We do not have the tabulation of the military observation stations.

The second request of the Committee was for a copy of the chart developed by the ATA in our planning program for jet routes. We indicated that we had only one handmade copy of this chart, and that duplication would not be possible. However, we believe that we can provide a satisfactory substitute for this chart.

There are enclosed three copies of a tabulation describing the required jet routes. These data were submitted to the CAA with a letter to the Administrator, dated July 15, 1958, a copy of which is attached.

We wish to again express our appreciation for the opportunity afforded to the Air Transport Association to appear before your committee and present our thoughts on aviation problems. In the event there is any additional information which we could supply, please feel free to request it of us.

Sincerely,

MILTON W. ARNOLD,
Vice President, Operations and Engineering.

JULY 15, 1958.

Hon. JAMES T. PYLE,
Administrator of Civil Aeronautics,
Department of Commerce, Washington, D. C.

DEAR Mr. PYLE: The Air Transport Association has been making a study of the operational requirements of the scheduled airlines for high-altitude jet routes. This study was coordinated with the majority of the airlines which have turbine-powered aircraft on order. The airlines have endorsed the proposal which we are attaching.

As you know, we have always maintained that the presently designated jet routes do not meet the operational requirements of the scheduled airlines. We believe that the attached proposals do meet the requirements with respect to terminals served, flexibility, stage lengths, and weather routing.

There is an immediate need for expediting action on these required routes. Jet aircraft will be in operation the latter part of this summer, with greater numbers coming into service each month thereafter. We are being pressed by the airlines to secure establishment of the required routes as rapidly as possible in order that they may have their navigational charts printed immediately for use in training programs. Also, we believe it is in the interest of the CAA air traffic control service to expedite this action.

It is the request of the scheduled airlines that these proposed jet routes be handled directly through the Washington Airspace Division as a complete package rather than be parceled to the regional airspace subcommittees for piecemeal handling. It will be noted that most of the routes bear a remarkable resemblance to the existing Victor 1500 series. Therefore, not too much difficulty should be encountered in clearing them through the Airspace Division.

It is recognized that there are a number of conflicts with restricted areas, although all prohibited areas have been avoided. It is believed that consideration should be given to the relocation of restricted areas where the absence of ground installations makes this possible. A compromise between the military and the civil interests in establishing these routes and their relationship to restricted areas will be necessary in the interest of providing the most efficient utilization of airspace.

A numbering system has been arbitrarily established using the J–100 series, in order that the jet routes proposed can be identified and will not be confused with those presently designated. Even numbers east-west, and odd numbers north-south have been used. They have been extended to the first fix in the adjoining countries; namely, Canada and Mexico. Each route has been described from terminal to terminal. At certain coterminals where flights may terminate at either, such as Fort Worth and Dallas, we have designated them as Fort Worth/Dallas or San Francisco/Oakland, etc.

We have utilized the criteria established in the Air Coordinating Committee SWG–21 report in establishing these routes with reference to the width of the airways and the distance between facilities. Under the SWG–21 recommendations, jet routes will have a floor of 30,000 feet. The scheduled airlines are of the opinion that this base should be established at 25,000 feet; and we would like to have this considered as a formal request for the floor on these routes. Placing the floor at this level would provide adequately for the route required by practically all turbo-powered aircraft. On the contrary, if the floor remains at 30,000 feet, almost every jet flight would be required to use a combination of two route structures. The first stage of flight would be below 30,000 feet, and the final stage would be above 30,000 feet. Also, the cutoff at 25,000 feet is a natural diversion for conventional aircraft.

We also respectfully request that the Civil Aeronautics Administration initiate action, as appropriate, to secure approval for required interconnecting routes from the Governments of Mexico and Canada.

We would be glad to discuss this program with you at your convenience. We believe this is a most urgent project which must be expedited in the immediate future.

Sincerely,

MILTON W. ARNOLD,
Vice President, Operations and Engineering.

ATA PROPOSED JET ROUTES

J–100: Boston, Mass.–Seattle, Wash.—Boston, Mass.; Gardner, Mass. VOR; Geneseo, N. Y. VOR; Peck, Mich. VOR; Wausau, Wis. VOR; Alexandria, Minn. VOR; Dickinson, N. Dak. VOR; Lewistown, Mont. VOR; Mullen Pass, Idaho. VOR; Seattle, Wash.

J–102: Boston, Mass.–Seattle, Wash.—Boston, Mass.; Gardner, Mass. VOR; Genesco, N. Y. VOR; Lansing, Mich. VOR; Naperville, Ill. VOR; Mason City, Iowa. VOR; Pierre, S. Dak. VOR; Sheridan, Wyo. VOR; Dillon, Mont. VOR; Pendleton, Oreg. VOR; Portland, Oreg. VOR; Seattle, Wash.

J–104: New York, N. Y.–Seattle, Wash.—New York, N. Y., Elmira, N. Y. VOR; Peck, Mich. VOR; Wausau, Wis. VOR; Alexandria, Minn. VOR; Dickinson, N. Dak. VOR; Lewistown, Mont. VOR; Mullen Pass, Idaho. VOR; Seattle, Wash.

J–106: New York, N. Y.–Seattle, Wash.—New York, N. Y.; Scranton, Pa. VOR; Erie, Pa. VOR; Waukegan, Ill. VOR; Madison, Wis. VOR; Alexandria, Minn. VOR; Dickinson, N. Dak. VOR; Lewistown, Mont. VOR; Mullen Pass, Idaho. VO; Seattle, Wash.

J–108: New York, N. Y.–Seattle, Wash.—New York, N. Y.; Watsonville, Pa. VOR; Toledo, O. VOR; Naperville, Ill. VOR; Mason City, Ia. VOR; Pierre, S. Dak. VOR; Sheridan, Wyo. VOR; Butte, Mont. VOR; Wenatchee, Wash. VOR; Seattle, Wash.

J–110: New York, N. Y.–Seattle, Wash.—New York, N. Y.; Watsonville, Pa. VOR; Toledo, O. VOR; Naperville, Ill. VOR; Mason City, Iowa; Pierre, S. Dak.; Sheridan, Wyo.; Dillon, Mont. VOR; Pendleton, Oreg. VOR; Portland, Oreg. VOR; Seattle, Wash.

J–112: Chicago, Ill.–Seattle, Wash.—Chicago, Ill.; Madison, Wis. VOR; Minneapolis, Minn. VOR; Bismarck, N. Dak. VOR; Dickinson, N. Dak. VOR; Lewistown, Mont. VOR; Mullen Pass, Idaho. VOR; Seattle, Wash.

J–114: New York, N. Y.—San Francisco/Oakland, Calif.—New York, N. Y.; Erie, Pa. VOR; Muskegon, Mich. VOR; Mason City, Iowa. VOR; Winner S. Dak. VOR; Casper, Wyo. VOR; Malad City, Idaho. VOR; Lovelock, Nev. VOR; San Francisco/Oakland, Calif.

J–116: New York, N. Y.–San Francisco/Oakland, Calif.— New York, N. Y.; Scranton, Pa. VOR; Erie, Pa. VOR; Keeler, Mich. VOR; Naperville, Ill. VOR; Newton, Iowa. VOR; O'Neill, Nebr. VOR; Scottsbluff, Nebr. VOR; Rock Springs, Wyo. VOR; Booneville, Utah. VOR; Reno, Nev. VOR; San Francisco/Oakland, Calif.

J–118: New York, N. Y.—San Francisco/Oakland, Calif.—New York, N. Y.; Ellwood City, Pa. VOR; Kokomo, Ind. VOR; Kirksville, Mo. VOR; Russell, Kans. VOR; Colorado Springs, Colo. VOR; Hanksville, Utah VOR; Coaldale, Nev. VOR; Modesto, Calif. VOR; San Francisco/Oakland, Calif.

J–120: New York, N. Y.–San Francisco/Oakland, Calif.—New York, N. Y.; Watsonville, Pa. VOR; Toledo, O. VOR; Chicago Heights, Ill. VOR; Quad City, Iowa. VOR; Lincoln, Nebr. VOR; Akron, Colo. VOR; Denver, Colo. VOR; Hanksville, Utah VOR; Pioche, Nev. VOR; Modesto, Calif. VOR; San Francisco/Oakland, Calif.

J–122: New York, N. Y.–San Francisco/Oakland, Calif.— New York, N. Y.; Ellwood City, Pa.; Kokomo, Ind. VOR; Kirksville, Mo. VOR; Mankato, Kans. VOR; Denver, Colo. VOR; Hanksville, Utah VOR; Pioche, Nev. VOR; Modesto, Calif. VOR; San Francisco/Oakland, Calif.

J–124: New York, N. Y.–San Francisco/Oakland, Calif.—New York, N. Y.; Washington, D. C. VOR; Front Royal, Va. VOR; Cincinnati, O. VOR; Troy, Ill. VOR; Kansas City, Mo. VOR; Russell, Kans. VOR; Colorado Springs, Colo. VOR; Hanksville, Utah VOR; Pioche, Nev. VOR; Modesto, Calif. VOR; San Francisco/Oakland, Calif.

J–126: Miami, Fla.–San Francisco/Oakland, Calif.—Miami, Fla.; Tampa, Fla. VOR; New Orleans, La. VOR; Houston, Tex. VOR; Junction, Tex. VOR;

Hudspeth, Tex. VOR; San Simon, Ariz. VOR; Gila Bend, Ariz. VOR; San Diego, Calif. VOR; Los Angeles, Calif. VOR; San Francisco/Oakland, Calif.

J–128: Miami, Fla.–San Francisco/Oakland, Calif.—Miami, Fla.; Tampa, Fla. VOR; New Orleans, La. VOR; Alexandria, La. VOR; Dallas, Tex. VOR; Lubbock, Tex. VOR; La Joya, N. Mex. VOR; Winslow, N. Mex. VOR; Las Vegas, Nev. VOR; Modesto, Calif. VOR; San Francisco/Oakland, Calif.

J–130: Miami, Fla.–San Francisco/Oakland, Calif.—Miami, Fla.; Tampa, Fla. VOR; New Orleans, La. VOR; Alexandria, La. VOR; Dallas, Tex. VOR; Abilene Tex. VOR; Hudspeth, Tex. VOR; San Simon, Ariz. VOR; Gila Bend, Ariz. VOR; San Diego, Calif. VOR; Los Angeles, Calif. VOR; San Francisco/Oakland, Calif.

J–132: Dallas, Tex.–San Francisco/Oakland, Calif.—Dallas, Tex.; Dalhart, Tex. VOR; Farmington, N. Mex. VOR; Pioche, Nev. VOR; Modesto, Calif. VOR; San Francisco/Oakland, Calif.

J–134: Chicago, Ill.–San Francisco/Oakland, Calif.—Chicago, Ill.; Galesburg, Ill. VOR; Kansas City, Mo. VOR; Anthony, Kans. VOR; Tucumcari, N. Mex. VOR; La Joya, Ariz. VOR; Phoenix, Ariz. VOR; Gila Bend, Ariz. VOR; San Diego, Calif. VOR; Los Angeles, Calif. VOR; San Francisco/Oakland, Calif.

J–136: Chicago, Ill.–San Francisco/Oakland, Calif.—Chicago, Ill.; Cedar Rapids, Iowa VOR; Wolback, Nebr. VOR; Sidney, Colo. VOR; Meeker, Colo. VOR; Delta, Utah VOR; Coaldale, Nev. VOR; San Francisco/Oakland, Calif.

J–138: New York, N. Y.–Los Angeles, Calif.—New York, N. Y.; Washington, D. C. VOR; Craigsville, Va. VOR; London, Ky. VOR; Nashville, Tenn. VOR; Dyersburg, Tenn. VOR; Tulsa, Okla. VOR; Amarillo, Tex. VOR; Grants, N. Mex. VOR; Prescott, Ariz. VOR; Los Angeles, Calif.

J–140: New York, N. Y.–Los Angeles, Calif.—New York, N. Y.; Lancaster, Pa. VOR; Charleston, W. Va. VOR; Bowling Green, Ky. VOR; Little Rock, Ark. VOR; Ft. Worth/Dallas, Tex.; Lubbock, Tex. VOR; La Joya, Ariz. VOR; St. John, Ariz. VOR; Rice, Calif. VOR; Los Angeles, Calif.

J–142: New York, N. Y.–Los Angeles, Calif.—New York, N. Y.; Washington, D. C. VOR; Herndon, Va. VOR; Craigsville, Va. VOR; London, Ky. VOR; Holly Spring, Miss. VOR; Texarkana, Ark. VOR; Dallas, Tex. VOR; Abilene, Tex. VOR; Hudspeth, Tex. VOR; San Simon, Ariz. VOR; Blythe, Calif. VOR; Los Angeles, Calif.

J–144: New York, N. Y.–Los Angeles, Calif.—New York, N. Y.; Washington, D. C. VOR; Gordonsville, Va. VOR; Asheville, N. C. VOR; Anniston, Ala. VOR; McComb, Miss. VOR; Houston, Tex. VOR; Hudspeth, Tex. VOR; San Simon, Ariz. VOR; Blythe, Calif. VOR; Los Angeles, Calif.

J–146: New York, N. Y.–Los Angeles, Calif.—New York, N. Y.; Watsonville, Pa. VOR; Toledo, Ohio VOR; Naperville, Ill. VOR; Quad City, Ill. VOR; Lincoln, Nebr. VOR; Akron, Colo. VOR; Denver, Colo. VOR; Hanksville, Utah VOR; Las Vegas, Nev. VOR; Los Angeles, Calif.

J–148: New York, N. Y.–Los Angeles, Calif.—New York, N. Y.; Ellwood City, Pa. VOR; Kokomo, Ind. VOR; Kirksville, Mo. VOR; Russell, Kans. VOR; Lamar, Colo. VOR; Alamosa, Colo. VOR; Tuba City, Ariz. VOR; Hector, Calif. VOR; Los Angeles, Calif.

J–150: New York, N. Y.–Los Angeles, Calif.—New York, N. Y.; Pittsburgh, Pa. VOR; Indianapolis, Ind. VOR; Columbia, Mo. VOR; Emporia, Kans. VOR; Liberal, Kans. VOR; Albuquerque, N. Mex. VOR; Prescott, Ariz. VOR; Los Angeles, Calif.

J–152: New York, N. Y.–Dallas/Ft. Worth, Tex.—New York, N. Y.; Kenton, Del. VOR; Richmond, Va. VOR; Spartanburg, S. C. VOR; Atlanta, Ga. VOR; Greenwood, Miss. VOR; Quitman, Tex. VOR; Dallas/Ft. Worth, Tex.

J–154: Houston, Tex.–Seattle, Wash.—Houston, Tex.; Ft. Worth, Tex. VOR; Dalhart, Tex. VOR; Denver, Colo. VOR; Kremmling, Colo. VOR; Malad City, Idaho VOR; Boise, Idaho VOR; The Dalles, Oreg. VOR; Portland, Oreg. VOR; Seattle, Wash.

J–156: Houston, Tex.–Seattle, Wash.—Houston, Tex.; Dallas, Tex. VOR; Wichita Falls, Tex. VOR; Lamar, Colo. VOR; Denver, Colo. VOR; Rock Springs, Wyo. VOR; Pocatello, Idaho VOR; Pendleton, Oreg. VOR; Seattle, Wash.

J–158: New York, N. Y.–Brownsville, Tex.—New York, N. Y.; Washington, D. C. VOR; Spartanburg, S. C. VOR; Montgomery, Ala. VOR; New Orleans, La. VOR; Houston, Tex. VOR; Corpus Christi, Tex. VOR; Kingsville, Intersection, Tex.; Brownsville, Tex.

J–160: Washington, D. C.–Chicago, Ill.—Washington, D. C.; Herndon, Va. VOR; Pittsburgh, Pa. VOR; Goshen, Ind. VOR; Chicago Heights, Ill. VOR.

J–162: Washington, D. C.–Chicago, Ill.—Washington, D. C.; Front Royal, Va.; Appleton, Ohio; Chicago Heights, Ill. VOR.

J–164: Fort Worth/Dallas, Tex. to San Francisco/Oakland, Calif. VOR.—Fort Worth/Dallas, Tex.; Abilene, Tex. VOR; Hudspeth, Tex. VOR; San Simon, Ariz. VOR; Intersection J–161 and J–142, Ariz.; Phoenix, Ariz. VOR; Las Vegas, Nev. VOR; Modesto, Calif. VOR; San Francisco/Oakland, Calif.

J–166: New York, N. Y.–Los Angeles, Calif.—New York, N. Y. VOR; Lancaster, Pa. VOR; Henderson, W. Va. VOR; Louisville, Ky. VOR; Roby, Mo. VOR; Ponca City, Okla. VOR; Dalhart, Tex. VOR; Grants, N. Mex. VOR; Prescott, Ariz. VOR; Riverside, Calif. VOR; Los Angeles, Calif.

J–168: Fort Worth/Dallas, Tex.–San Francisco/Oakland, Calif.—Fort Worth/Dallas, Tex. VOR; Lubbock, Tex. VOR; La Joya, N. Mex. VOR; Tuba City, Ariz. VOR; Pioche, Nev. VOR; Modesto, Calif. VOR; San Francisco/Oakland, Calif.

J–170: Chicago, Ill.–Seattle, Wash.—Chicago, Ill. VOR; Newton, Iowa VOR; Ainsworth, Nebr. VOR; Casper, Wyo. VOR; Dubois, Idaho VOR; Baker, Oreg. VOR; Portland, Oreg. VOR; Seattle, Wash.

J–172: Boston, Mass.–Seattle, Wash.—Boston, Mass.; Gardner, Mass. VOR; Genesco, N. Y. VOR; Peck, Mich. VOR; Wausau, Wis. VOR; Minneapolis, Minn. VOR; Bismarck, N. Dak. VOR; Dickinson, N. Dak. VOR; Lewiston, Mont. VOR; Mullan Pass, Idaho VOR; Seattle, Wash.

J–174: New York, N. Y.–Seattle, Wash.—New York, N. Y.; Erie, Pa. VOR; Muskegon, Mich. VOR; Minneapolis, Minn. VOR; Bismarck, N. Dak. VOR; Dickinson, N. Dak. VOR; Lewiston, Mont. VOR; Mullan Pass, Idaho VOR; Seattle, Wash.

J–176: Washington, D. C.–Seattle, Wash.—Washington, D. C.; Herndon, Va. VOR; Pittsburgh, Pa. VOR; Goshen, Ind. VOR; Milwaukee, Wis. VOR; Minneapolis, Minn. VOR; Bismarck, N. Dak. VOR; Dickinson, N. Dak. VOR; Lewiston, Mont. VOR; Mullen Pass, Idaho VOR; Seattle, Wash.

North-south routes

J–101: Los Angeles, Calif.–Seattle, Wash.—Los Angeles, Calif.; Santa Barbara, Calif. VOR; San Francisco/Oakland, Calif; Ukiah, Calif. VOR; North Ben. Oreg. VOR; Olympia, Wash. VOR; Seattle, Wash.

J–103: Los Angeles, Calif.–Seattle, Wash.—Los Angeles, Calif.; Fillmore, Calif. VOR; San Francisco/Oakland, Calif.; Red Bluff, Calif. VOR; Newberg, Oreg. VOR; Olympia, Wash. VOR; Seattle, Wash.

J–105: Los Angeles, Calif.–Seattle, Wash.—Los Angeles, Calif.; Fillmore, Calif. VOR; Fresno, Calif. VOR; Yuba Pass, Calif. VOR; Klamath Falls, Oreg. VOR; Portland, Oreg. VOR; Olympia, Wash. VOR; Seattle, Wash.

J–107: Los Angeles, Calif.–Seattle, Wash.—Los Angeles, Calif.; Lake Hughes, Calif. VOR; Reno, Nev. VOR; Redmond, Oreg. VOR; Seattle, Wash.

J–109: Laredo, Tex.-Minneapolis, Minn.—Laredo, Tex.; Waco, Tex. VOR; Dallas/Fort Worth, Tex.; McAllister, Okla. VOR; Kansas City, Mo. VOR; Mason City, Iowa VOR; Minneapolis, Minn.

J–111: Lardeo, Tex.–Chicago, Ill.—Laredo, Tex.; Waco, Tex. VOR; Dallas, Fort Worth, Tex.; Springfield, Mo. VOR; Peoria, Ill. VOR; Chicago, Ill.

J–113: McAllen, Tex.–Chicago, Ill.—McAllen, Tex.; Alice, Tex. VOR; Bryan, Tex. VOR; Sulphur Springs, Tex. VOR; Roby, Mo. VOR; Pontiac, Ill. VOR; Chicago, Ill.

J–115: Brownsville, Tex.–Chicago, Ill.—Brownsville, Tex.; Kingsville Intersection, Tex.; Corpus Christi, Tex. VOR; Houston, Tex. VOR; Goodwin, Ark. VOR; Farmington, Mo. VOR; Chicago, Ill.

J–117: New Orleans, La.–Chicago, Ill.—New Orleans, La.; Holly Springs, Miss. VOR; Maple Grove, Ill. VOR; Chicago, Ill.

J–119: Miami, Fla.–St. Louis, Mo.—Miami, Fla.; Tampa, Fla. VOR; Tallahassee, Fla. VOR; Muscle Shoals, Ala. VOR; St. Louis, Mo.

J–121: Miami, Fla.–Chicago, Ill.—Miami, Fla.; Punta Gorda, Fla. VOR; Valdosta, Ga. VOR; Chattanooga, Tenn. VOR; Scotland, Ill. VOR; Chicago, Ill.

J–123: Miami, Fla.–Chicago, Ill.—Miami, Fla.; Jacksonville, Fla. VOR; Royston, Ga. VOR; London, Ky. VOR; Indianapolis, Ind. VOR; Chicago, Ill.

J–125: Miami, Fla.–Detroit, Mich.—Miami, Fla.; Daytona Beach, Fla. VOR; Allendale, Ga. VOR; Hickory, N. C. VOR; Appleton, Ohio VOR; Detroit, Mich.

J–127: Miami, Fla.–New York, N. Y.—Miami, Fla.; Daytona Beach, Fla. VOR; Allendale, Ga. VOR; Richmond, Va. VOR; Washington, D. C. VOR; New York, N. Y.

J–129: Miami, Fla.–New York, N. Y.—Miami, Fla.; Daytona Beach, Fla. VOR; Charleston, S. C. VOR; Hopewell, Va. VOR; Kenton, Del. VOR; New York, N. Y.

J–131: Miami, Fla.–Moncton, New Brunswick—Miami, Fla.; West Palm Beach, Fla. VOR; corridor 1150 to Wilmington, N. C. VOR; Waterloo, Del. VOR; New York, N. Y. VOR; Boston, Mass. VOR; Princeton, Maine VOR; Moncton, New Brunswick.

J–133: Miami, Fla.–New York, N. Y.—Miami, Fla.; Bemini, British West Indies H-type facility; tuna intersection; New York, N. Y.

J–135: Key West, Fla.–Montreal, Canada.—Key West, Fla.; Miami, Fla. VOR; West Palm Beach, Fla. VOR; corridor 1150 to Wilmington, N. C. VOR; Waterloo, Del. VOR; New York, N. Y. VOR; Montreal, Canada.

J–137: Miami, Fla–Buffalo, N. Y.—Miami, Fla; Daytona Beach, Fla. VOR; Charleston, S. C. VOR; Montebello, Va. VOR; Buffalo, N. Y.

J–139: Miami, Fla.–Cleveland, Ohio—Miami, Fla.; Daytona Beach, Fla. VOR; Allendale, Ga. VOR; Clarleston, W. Va. VOR; Cleveland, Ohio VOR.

International routes

J–141: Miami, Fla.—Montreal, Canada.—Miami, Fla.; Bemini, British West Indies H-type facility; Nantucket, Mass. H-type facility; Boston, Mass. VOR; Montreal, Canada.

J–143: San Francisco, Calif.–Cranbrook, Canada.—San Francisco, Calif.; Lake View, Oreg. VOR; Pendleton, Oreg. VOR; Spokane, Wash. VOR; Cranbrook, Canada.

J–145: San Francisco, Calif.–Medicine Hat, Canada.—San Francisco, Calif.; Sacramento, Calif. VOR; Rome, Oreg. VOR; Missoula, Mont. VOR; Medicine Hat, Canada.

J–147: New York, N. Y.–Seven Islands, Canada—New York, N. Y.; Boston, Mass. VOR; Presque Isle, Maine VOR; Seven Islands, Canada.

J–149: San Francisco, Calif.–Neepawa, Canada.—San Francisco, Calif.; Lovelock, Nev. VOR; Burley, Idaho VOR; Billings, Mont. VOR; Williston, N. Dak. VOR; Neepawa, Canada.

J–151: Los Angeles, Calif.–Winnipeg, Canada—Los Angeles, Calif.; Las Vegas, Nev. VOR; Milford, Utah VOR; Rock Springs, Wyo. VOR; Crazy Woman, Wyo. VOR; Dickinson, N. Dak. VOR; Winnipeg, Canada.

J–153: Los Angeles, Calif.–Lakehead, Canada.—Los Angeles, Calif.; Las Vegas, Nev. VOR; Hanksville, Utah VOR; Cheyenne, Wyo. VOR; Winner, S. Dak. VOR; Alexandria, Minn. VOR; Lakeland, Canada.

J–155: Chicago, Ill.–Gore Bay, Canada.—Chicago, Ill.; White Cloud, Mich. VOR; Gore Bay, Canada.

157: Chicago, Ill.–Malton, Canada.—Chicago, Ill.; Lansing, Mich. VOR; Malton, Canada.

J–159: San Francisco, Calif.–Punta Penasco, Mexico—San Francisco, Calif.; Los Angeles, Calif. VOR; San Diego, Calif. VOR; Punta Penasco, Mexico.

J–161: San Francisco, Calif.–Nuevo Casas Grandes, Mexico.—San Francisco, Calif.; Modesto, Calif. VOR; Las Vegas, Calif. VOR; Phoenix, Ariz. VOR; Neuvo Casas Grandes, Mexico.

J–163: New York, N. Y.–Yarmouth, Nova Scotia.—New York, N. Y.; Nautucket, Mass. VOR; Yarmouth, Nova Scotia.

UNITED STATES DEPARTMENT OF COMMERCE, WEATHER BUREAU

STATION INVENTORY, OCTOBER 1, 1957

(For official distribution)

I. First order land stations:

	Number WBAS	Number WBO	Total number WBO and WBAS	Number localities with stations
Region I	54	16	70	63
Region II	59	[1] 12	71	66
Region III	60	17	77	67
Region IV	47	15	62	56
United States total	220	60	280	252
Region V	15	1	16	15
Pacific	7	4	11	11
West Indies	1	1	2	2
Arctic	1	4	5	5
Outside United States total	24	10	34	33
Grand total	244	70	314	285

[1] WBO Swan Island is included under West Indies rather than region II.

II. First order ocean stations: Atlantic, 4; Pacific, 2; total, 6.
III. Ship RAOB program: Atlantic, 2; Gulf, 2; Pacific, 5; total, 9.
IV. Second order stations.

	CAA	ASSA [1]	SAWRS	Total 2d order
Region I	35	12	67	114
Region II	58	[2] 13	56	127
Region III	62	21	67	150
Region IV	51	36	47	134
United States total	206	82	237	525
Region V	22	24	15	61
Pacific	1	3	9	13
West Indies	2	[3] 4	2	8
Outside United States total	25	31	26	82
Grand total	231	113	263	607

[1] ASSA: Aviation, synoptic, synoptic and aviation observations, usually on a fee basis.
[2] 3 Central American stations not included.
[3] 1 paid. Pibal only station not included.

V. Automatic teletypewriter weather stations, 9. O. and S. F. DIVISION, *October 1, 1957.*

EXHIBIT 7

AIRPORT OPERATORS COUNCIL, INC.,
Washington, D. C., July 31, 1958.

Mr. JEROME PLAPINGER,
Counsel to the Legal and Monetary Subcommittee of the Committee on Goverment Operations, House of Representatives, Washington, D. C.

DEAR MR. PLAPINGER: In accordance with your request during my testimony before your committee on July 30, I am enclosing herewith a copy of the national airport survey for the 4-year period 1958–62, dated January 20, 1958, which was jointly conducted by the National Association of State Aviation Officials, the Airport Operators Council and the American Association of Airport Executives. In this connection you may also be interested in the distribution of $63 million authorized for fiscal year 1958 as reported by the Department of Commerce Twelfth Annual Report of Operation under the Federal Airport Act, 1957. A copy of this is also enclosed.

Further in this connection, we are enclosing copy of Federal airport program CAA allocations and sponsors' requests, fiscal year ending June 30, 1959, for AOC members, dated March 21, 1958. This is a tabulation by members of the Airport Operators Council showing the amount of money allocated and the description of work for which it is allocated in the fiscal year 1959 and opposite that the amount requested by the sponsors with description of the work desired to be accomplished. You will note that the funds allocated total a little less than $30 million as contrasted with requests of $129 million.

The committee may also be interested in including in the record correspondence between the Airport Operators Council, the Air Transport Association of America and the Aircraft Industries Association with respect to voluntary efforts of the industry toward coordinated jet planning in amplification of my remarks in this connection. These include the following:

February 8, 1956: A letter from Robert Aldrich, president, Airport Operators Council to Stuart G. Tipton, president, Air Transport Association of America, and Adm. D. C. Ramsey, president, Aircraft Industries Association.

February 14, 1956: A letter from Adm. D. C. Ramsey, president, AIA, to Robert Aldrich, president, AOC.

March 22, 1956: A letter from Stuart G. Tipton, president, ATA to Robert Aldrich, president, AOC.

August 26, 1957: A letter from E. Thos. Burnard, executive director, AOC, to Stuart G. Tipton, president, ATA.

September 4, 1957: A letter from Milton W. Arnold, vice president-operations and Engineering, ATA, to E. Thos. Burnard, executive director, AOC.

August 29, 1957: A memorandum from Milton W. Arnold, vice president-operations and Engineering, ATA, to all domestic carriers.

As I stated in my testimony, the individual airlines to whom the questionnaires were sent by the airports, as referred to in this correspondence, have not done a very complete job of returning them to the airports or if returned they are, with a few exceptions, very incomplete.

In further amplification of my tesimony regarding the inability of the AOC to obtain useful planning information from the CAA with respect to runway lengths, I am enclosing also for your use and insertion in the record if appropriate, the following:

February 21, 1956: A letter from E. Thos. Burnard, executive director of AOC, to CAA Administrator Charles J. Lowen, Jr., a reply to which has never been received.

May 7, 1958: A letter from E. Thos. Burnard to CAA Administrator James T. Pyle, requesting status of TSO–N6a.

May 13, 1958: A letter from James T. Pyle, CAA Administrator, to E. Thos. Burnard, executive director of AOC, transmitting interim TSO–N6b, a draft revision of TSO–N6a, runway strength and dimensional standards for air carrier operations.

June 11, 1958: A letter from E. Thomas Burnard, executive director of AOC, to James T. Pyle, Administrator of CAA, requesting reasons and justification for proposed changes in TSO–N6a.

July 10, 1958: A letter from William B. Davis, Deputy Administrator, CAA to E. Thomas Burnard, executive director, AOC, transmitting background information to support the increases in runway length which the revision permits.

July 31, 1958: A letter from E. Thomas Burnard, executive director of AOC, to William B. Davis, Deputy Adminstrator, CAA, requesting an opportunity to complete an analysis of CAA's reasons for proposed changes.

I trust this information will be of interest to you and the committee. If we can be of further service please let us know.

Sincerely,

E. THOS. BURNARD, *Executive Director.*

NATIONAL ASSOCIATION OF STATE AVIATION OFFICIALS

AIRPORT OPERATORS COUNCIL

AMERICAN ASSOCIATION OF AIRPORT EXECUTIVES

JANUARY 20, 1958.

NATIONAL AIRPORT SURVEY, 4-YEAR PERIOD, 1958–62

In order to obtain a current appraisal of the funds required to develop public airport facilities during the next 4 fiscal years (July 1, 1958, to June 30, 1962), 3 organizations—the National Association of State Aviation Officials, the Airport Operators Council and the American Association of Airport Executives—jointly conducted a national survey during November and December 1957. A State supervisor designated for each State and Territory sent a questionnaire to all known airport authorities and/or communities in his State that now own a public airport, or who contemplate development of a new public airport during the next 4 years. The State supervisor tabulated the replies for his State and compiled a State (or Territorial) summary. These summaries were sent to the national survey headquarters in Washington where they were tabulated and compiled on a national basis.

Of the 2,874 public airports in the continental United States and Territories to which questionnaires were sent, 1,255 responded and reported 1,138 projects planned during the next 4 years.

Total reported cost for land acquisition, and for landing area and terminal area development planned during this 4-year period, is $1,066,945,661; $521,146,951 of this cost is estimated to become available from local sources, and $68,513,402 from State sources, for a total of $589,660,353, leaving a deficit of $477,285,308.

Additional funds to meet this deficit of over $477 million will be needed as follows:

Fiscal year ending June 30, 1959	$128, 657, 730
Fiscal year ending June 30, 1960	131, 792, 064
Fiscal year ending June 30, 1961	114, 915, 094
Fiscal year ending June 30, 1962	101, 920, 420

On the next page will be found a tabulation of the 4-year national airport survey with totals by States and Territories.

Attached also is a tabulation of the publicly and privately owned airports in each State, together with the number of based aircraft at these airports.

National Airport survey, 4-year period (July 1, 1958, to June 30, 1962), jointly conducted by National Association of State Aviation Officials, Airport Operators Council, American Association of Airport Executives

	Publicly owned airports	Airports reporting projects planned	Cost of projects planned	Funds available and anticipated from local and State sources	Additional funds needed
STATES					
Alabama	45	16	$16,260,000	$8,130,000	$8,130,000
Arizona	34	11	11,087,825	6,469,705	4,618,120
Arkansas	36	10	1,688,016	1,055,000	633,016
California	234	43	128,596,386	101,903,433	26,692,953
Colorado	56	18	24,175,010	11,525,522	12,649,488
Connecticut	8	9	11,861,000	6,658,760	5,202,240
Delaware	3	0			
Florida	100	12	11,800,000	9,386,500	2,413,500
Georgia	63	13	21,576,814	11,291,754	10,285,060
Idaho	98	19	3,133,260	516,540	2,616,720
Illinois	50	87	82,225,000	61,229,500	20,995,500
Indiana	37	39	14,367,050	7,765,450	6,601,600
Iowa	61	49	8,254,072	4,594,151	3,659,921
Kansas	110	8	326,290	148,815	177,475
Kentucky	23	37	19,882,500	9,982,250	9,900,250
Louisiana	42	11	16,442,413	12,171,040	4,271,373
Maine	28	14	3,585,500	1,764,128	1,821,372
Maryland	12	5	13,598,500	1,674,250	11,924,250
Massachusetts	23	38	26,804,500	5,691,000	21,113,500
Michigan	128	125	64,182,735	34,721,385	29,461,350
Minnesota	97	19	29,502,600	16,937,950	12,564,650
Mississippi	35	19	4,575,500	3,894,500	681,000
Missouri	49	19	13,334,925	5,562,850	7,772,075
Montana	103	24	5,022,008	2,011,429	3,010,579
Nebraska	79	13	6,082,875	2,656,243	3,426,632
Nevada	51	8	5,767,000	3,160,066	2,606,934
New Hampshire	13	9	1,890,670	945,335	945,335
New Jersey	13	4	28,725,000	13,697,500	15,027,500
New Mexico	47	17	16,506,160	7,830,230	8,675,930
New York	49	26	135,378,888	67,267,800	68,111,088
North Carolina	36	8	12,033,000	4,825,000	7,208,000
North Dakota	68	12	1,722,000	885,400	836,600
Ohio	47	20	40,769,710	13,550,240	27,219,470
Oklahoma	75	17	25,183,805	14,561,517	10,622,288
Oregon	54	15	7,552,694	4,844,180	2,708,514
Pennsylvania	49	29	91,284,399	45,632,826	45,651,573
Rhode Island	4	4	3,028,250	1,514,125	1,514,125
South Carolina	34	20	5,166,000	2,770,000	2,396,000
South Dakota	55	28	1,649,400	775,218	874,182
Tennessee	43	41	28,102,400	19,035,550	9,066,850
Texas	181	35	28,342,474	15,496,329	12,846,145
Utah	47	17	8,750,657	4,540,135	4,210,522
Vermont	11	11	2,274,750	1,137,375	1,137,375
Virginia	31	22	8,753,592	3,719,450	5,034,142
Washington	89	17	8,101,965	4,604,880	3,497,085
West Virginia	27	9	8,928,000	4,064,300	4,863,700
Wisconsin	63	29	15,214,500	7,744,950	7,469,550
Wyoming	37	23	2,236,568	1,207,942	1,028,626
Total, States	2,678	1,079	1,025,726,661	571,552,503	454,174,158
TERRITORIES					
Alaska	178	51	15,903,500	1,838,850	14,064,650
Hawaii	14	5	21,231,500	14,000,000	7,231,500
Puerto Rico	4	3	4,084,000	2,269,000	1,815,000
Total, Territories	196	59	41,219,000	18,107,850	23,111,150
United States total	2,874	1,138	1,066,945,661	589,660,353	477,285,308

SURVEY OF CIVIL AIRPORTS AND BASED CIVIL AIRCRAFT BY STATE, OWNERSHIP TYPE, AND USE TYPE, MARCH 1957

Ownership type: Publicly owned: Any airport owned or controlled by a city, county, State, Federal Government or similar political subdivision thereof. Privately owned: all airports that do not qualify as publicly owned.

Use type: Public use: airports attended each day and having at least fuel for sale, plus all other airports that serve air carriers, CAA intermediate fields, airports having beacons indicating a lighted airport or airports on which Federal funds have been expended under the Federal-aid airport program or the development of landing areas. Limited use: airports that do not qualify as public-use airports.

NOTE.—This information has been compiled from the records of the Civil Aeronautics Administration as revised by individual State agencies, except the data for Arkansas, Colorado, Georgia, Idaho, Kansas, Kentucky, Maryland, Nevada, New Jersey, New Mexico, North Carolina, Ohio, Oklahoma, South Carolina, Texas, and Utah are based solely on CAA records. Seaplane bases are not included in this tabulation.

	Airports									Based aircraft								
	Public use airports			Limited use airports			Total airports			At public use airports			At limited use airports			Total		
	Publicly owned	Privately owned	Total	Publicly owned	Privately owned	Total	Publicly owned	Privately owned	Total	Publicly owned	Privately owned	Total	Publicly owned	Privately owned	Total	Publicly owned	Privately owned	Total
Alabama	23	7	30	22	23	45	45	30	75	334	52	386	41	71	112	375	123	498
Arizona	24	20	44	10	87	97	34	107	141	650	226	876	175	50	225	825	276	1,101
Arkansas	27	13	40	9	32	41	36	45	81	488	108	596	17	63	80	505	171	676
California	157	95	252	77	201	278	234	296	530	6,697	2,680	9,377	1,600	573	2,173	8,297	3,253	11,550
Colorado	25	18	43	31	43	74	56	71	127	642	260	902	58	69	127	700	329	1,029
Connecticut	8	10	18	0	37	37	8	47	55	238	137	375	0	65	65	238	202	440
Delaware	2	6	8	1	12	13	3	18	21	30	107	137	1	56	57	31	163	194
Florida	73	19	92	27	23	50	100	42	142	1,861	188	2,049	29	53	82	1,890	241	2,131
Georgia	35	10	45	28	38	66	63	48	111	732	120	852	60	63	123	792	183	975
Idaho	49	8	57	49	54	103	98	62	160	544	158	702	30	38	68	573	188	761
Illinois	49	78	127	1	203	204	50	281	331	1,278	2,128	3,404	13	264	277	1,289	2,392	3,681
Indiana	31	59	90	6	100	106	37	159	196	835	1,078	1,913	21	155	176	856	1,233	2,089
Iowa	46	34	80	15	96	111	61	130	191	843	267	1,110	72	280	352	915	547	1,462
Kansas	75	24	99	35	104	139	110	128	238	1,093	241	1,334	75	184	259	1,168	425	1,593
Kentucky	19	7	26	4	16	20	23	23	46	405	59	464	18	34	52	423	93	516
Louisiana	27	11	38	15	125	140	42	136	178	743	125	868	37	201	238	780	326	1,106
Maine	15	10	25	13	64	77	28	74	102	139	75	214	19	23	42	158	98	256
Maryland	11	15	26	1	20	21	12	35	47	248	331	579	11	99	110	259	430	689
Massachusetts	23	29	52	0	16	16	23	45	68	529	514	1,043	0	53	53	529	567	1,096
Michigan	70	44	114	58	54	112	128	98	226	1,764	849	2,613	135	108	243	1,899	957	2,856
Minnesota	56	23	79	41	292	333	97	315	412	1,157	124	1,281	128	17	145	1,285	141	1,426
Mississippi	23	10	33	12	32	44	35	42	77	500	132	632	24	94	118	524	226	750
Missouri	36	24	60	13	41	54	49	65	114	680	548	1,228	13	80	93	693	628	1,321
Montana	45	9	54	58	58	116	103	67	170	596	10	606	95	14	109	691	24	715
Nebraska	51	17	68	28	152	180	79	169	248	683	166	849	55	215	270	738	381	1,119
Nevada	20	6	26	31	23	54	51	29	80	235	103	338	5	9	14	240	112	352
New Hampshire	10	3	13	3	14	17	13	17	30	102	31	133	23	35	58	125	66	191
New Jersey	11	41	52	2	53	55	13	94	107	606	696	1,302	4	142	146	610	836	1,446
New Mexico	27	10	37	20	42	62	47	52	99	510	74	584	54	36	90	564	110	674
New York	41	70	111	8	145	153	49	215	264	1,377	1,232	2,609	10	332	342	1,387	1,564	2,951
North Carolina	30	25	55	6	52	58	36	87	123	637	329	966	8	163	171	645	492	1,137
North Dakota	22	15	37	46	92	138	68	107	175	330	72	402	123	116	239	453	188	641
Ohio	40	81	121	7	139	146	47	220	267	1,602	1,245	2,847	34	545	579	1,636	1,790	3,426
Oklahoma	41	20	61	34	49	83	75	69	144	967	367	1,334	94	85	179	1,061	452	1,513
Oregon	29	16	45	25	75	100	54	91	145	776	408	1,184	35	146	181	811	554	1,365
Pennsylvania	44	97	141	5	93	98	49	190	239	1,010	1,442	2,452	11	126	137	1,021	1,568	2,589

	Airports									Based aircraft								
	Public use airports			Limited use airports			Total airports			At public use airports			At limited use airports			Total		
	Publicly owned	Privately owned	Total	Publicly owned	Privately owned	Total	Publicly owned	Privately owned	Total	Publicly owned	Privately owned	Total	Publicly owned	Privately owned	Total	Publicly owned	Privately owned	Total
Rhode Island	3	3	6	1	3	4	4	6	10	95	71	166	0	20	20	95	91	186
South Carolina	25	7	32	9	24	33	34	31	65	350	52	402	17	39	56	367	91	458
South Dakota	50	16	66	5	5	10	55	21	76	513	144	657	6	4	10	519	148	667
Tennessee	31	2	33	12	8	20	43	10	53	648	4	652	41	13	54	689	17	706
Texas	141	85	226	40	395	435	181	480	661	3,685	1,584	5,269	220	565	785	3,905	2,149	6,054
Utah	33	6	39	14	5	19	47	11	58	331	63	394	23	3	26	354	66	420
Vermont	7	3	10	4	7	11	11	10	21	61	25	86	9	15	24	70	40	110
Virginia	23	20	43	8	40	48	31	60	91	369	405	774	21	86	107	390	491	881
Washington	50	27	77	39	66	105	89	93	182	1,056	535	1,591	92	152	244	1,148	687	1,835
West Virginia	25	2	27	2	14	16	27	16	43	349	20	369	18	42	60	367	62	429
Wisconsin	41	40	81	22	59	81	63	99	162	673	415	1,088	65	112	177	738	527	1,265
Wyoming	24	6	30	13	94	107	37	100	137	336	17	353	9	19	28	345	36	381
Total	1,768	1,201	2,969	910	3,420	4,330	2,678	4,641	7,319	40,325	20,017	60,342	3,649	5,727	9,276	43,973	25,734	69,707

DEPARTMENT OF COMMERCE 12TH ANNUAL REPORT OF OPERATIONS UNDER THE FEDERAL AIRPORT ACT, 1957

Distribution of $63,000,000 authorization for fiscal year 1958

State:	*Apportionment* [1]
Alabama	$836, 180
Arizona	939, 544
Arkansas	670, 938
California	2, 734, 099
Colorado	955, 269
Connecticut	340, 256
Delaware	64, 980
District of Columbia	120, 271
Florida	851, 856
Georgia	942, 419
Idaho	694, 985
Illinois	1, 721, 651
Indiana	852, 738
Iowa	800, 327
Kansas	882, 263
Kentucky	733, 174
Louisiana	760, 599
Maine	385, 768
Maryland	439, 214
Massachusetts	767, 282
Michigan	1, 654, 594
Minnesota	1, 072, 185
Mississippi	676, 053
Missouri	1, 096, 682
Montana	1, 157, 301
Nebraska	759, 013
Nevada	827, 050
New Hampshire	147, 216
New Jersey	781, 667
New Mexico	985, 691
New York	2, 606, 233
North Carolina	989, 458
North Dakota	605, 945
Ohio	1, 511, 101
Oklahoma	$841, 462
Oregon	932, 127
Pennsylvania	1, 902, 130
Rhode Island	127, 157
South Carolina	542, 723
South Dakota	657, 256
Tennessee	798, 404
Texas	3, 093, 777
Utah	719, 824
Vermont	126, 216
Virginia	803, 025
Washington	868, 070
West Virginia	475, 132
Wisconsin	993, 906
Wyoming	754, 789
Total State apportionment	45, 000, 000
Discretionary funds [1]	15, 000, 000
Total funds for continental United States	60, 000, 000
Territory:	
Alaska	1, 350, 000
Hawaii	750, 000
Puerto Rico	600, 000
Virgin Islands	300, 000
Total	3, 000, 000
Grand total	63, 000, 000

FEDERAL AIRPORT PROGRAM

CAA allocations and sponsors requests fiscal year ending June 30, 1959, for AOC members

Location, sponsor, and name of airport	Federal funds allocated		Sponsors request	
	Amount	Description of work	Description of work	Amount
Atlanta: City of Atlanta; municipal...	$1,000,000	Construct terminal building (3d stage) and concourses (2d stage).	Land acquisition and clear zones; construct 3d stage terminal building; construct fire station, boiler house, sewage, and utilities; remodel administration building; extend east/west runway; construct high speed turnoffs and taxiways; construct holding pads; widen existing taxiways; passenger concourses; access road and auto parking areas.	$12,679,500
Baltimore: City of Baltimore; Friendship International Airport.	288,250	Construct air freight terminal building; enlarge passenger terminal building.	Air freight terminal building; passenger terminal building addition; high speed turnoff and parallel taxiway; jet engine water treatment system; addition to maintenance building; land-approach light system; completion parallel northwest/southeast runway; completion terminal building area.	5,547,250
Birmingham: City of Birmingham; municipal airport.	900,000	Acquire land in clear zones; construct terminal building (additional funds).	Engineering master planning; site preparation and utilities for buildings; terminal building; apron and taxiway paving; entrance roads; automobile parking area; apron and taxiway lighting; relocation of 50th St. and 65th Pl.; additional land acquisition for northeast, north, south, and southwest clear and approach zones; construct general aviation buildings, hangars, taxiways, apron and facilities; fencing extended areas.	5,675,000
Boston: Commonwealth of Massachusetts; Logan International Airport.	775,000	Construct maintenance building including shops and fire station; apron for building station 6 and 7.	Construct apron building. airline stations 6 and 7; electrical substation No. 2; maintenance building, including shops and fire station; construct and reconstruct ramp; additional high intensity lighting runway 4R–22L; expand auto parking; sealcoating runways and taxiways, holding pads; taxiways, underground aircraft fuel system; terminal building; incinerator building, landscaping.	7,430,500
Chicago: City of Chicago; Chicago-Midway Airport.	785,000	Acquire property, northwest approach area; pave run-up area, southwest corner and northwest corner, including taxiways and squaring runway ends; pave extension to runway 13L and 22R with connecting taxiway to runway 22L; resurface runway 18L–36R as taxiway; pave service roads around runway ends; fence new property.	Acquire land; extend runway lighting; install high intensity lights on runway 13R; service building; addition to north terminal building; taxiway lights; strengthen and extend runways; access roads; strengthen taxiways; aircraft parking aprons.	2,978,065
City of Chicago: O'Hare Field-Chicago International Airport.	1,000,000	Construct portion of runway 27L–9R.....	Construct new runway 10,170 feet long and 200 feet wide (27–9R) including center line narrow gage lighting, 75-foot-wide taxiway with 25-foot stabilized shoulders on either side, high speed bleed offs, necessary drainage and grading.	1,250,000
City of Chicago: Merrill C. Meigs Field.	158,225	Construct terminal building; strengthen north/south runway, north/south taxiway and apron.	Strengthen runway, taxiway and ramp; erection permanent brick 2-story terminal building 100 by 250 feet.	308,225

Cincinnati: Kenton County (Ky.); Greater Cincinnati Airport.	500,000	Site preparation for north/south runway and taxiway extension.	Land; grade, clear, drain and pave 2,000-foot extension of north/south runway; overlay existing north/south runway; overlay, widen, drain and extend 2,000 feet north/south taxiway; warmup pads; light north/south runway with high intensity lights; light taxiway.	1,691,750
Cleveland: city of Cleveland; Cleveland-Hopkins Airport.	400,000	Extend runway 5R–23L, 2,000 feet	Extend runway 5R–23L approximately 2,000 feet	400,000
Columbus: city of Columbus; Port Columbus.	750,000	Construct runway 9L–27R, 6,000 by 150 feet	Runway R–L/27–R, first phase; landscapeng: fencing; rehabilitation east portion of runway 9–R/27–L; extend apron to AMF cargo building; extend apron to large hangar area; dual entrance road; extend taxiway S 2,700 feet west; additional taxiways, terminal area; high speed turnouts; executive terminal building; acquire land.	3,568,120
Dayton: city of Dayton; James M. Cox Airport.	900,000	Pave apron, taxiways, road and parking area; site preparation in terminal area; utilities.	Terminal building structure (exclusive of foundations); parking lot and access road; apron lighting; street and parking lot lighting; landscaping.	1,530,500
Denver: city and county of Denver: Stapleton Airfield.		None	Land acquisition: construct north/south runway, aprons, and taxiway system; enlarge terminal building; construct fire station, post office and cargo building; auto parking area, access and service road; fencing; pave helicopter landing area.	10,953,849
Detroit: University of Michigan; Willow Run Airport.	250,000	Strengthen runway 27L–9R and 22L–4R; extend center taxiway.	Extend center taxiway, runway 4R–22L, runway 14–32; resurface east half of runway 27L–9R, east half of runway 27R–9L, east half 22L–4R, west ramp and outside taxiway.	1,104,500
Honolulu: Territory of Hawaii; Honolulu International Airport.	750,000	Construct terminal buildings (stage 2)	Site preparation, terminal area; construct terminal buildings, taxiway, aprons, and roadways.	2,875,000
Houston: City of Houston; Houston International Airport.	1,000,000	Expand terminal building; construct loading finger and enlarge apron.	Northeast/southwest runway extension 735 by 150 feet; taxiway No. 1, 1,600 by 75 feet; terminal building addition; apron pavement; loading finger; auto parking; new northwest/southeast runway; taxiway No. 12, 4,250 by 75 feet; storm sewers; remodel old terminal building; taxiway No. 3.	2,426,500
City of Houston: Municipal airport (new).		None	Purchase 3,126 acres of land for new airport	930,469
Jacksonville: City of Jacksonville; Thomas Cole Imeson Airport.		None	Construct addition to terminal building	100,000
Kansas City: City of Kansas City; Mid-Continent International Airport.	537,000	Pave north/south runway extension 3,000 by 150 feet and taxiway (additional funds); install high intensity lights on north/south runway extension and taxiway lights on north/south and west portion of east/west taxiway; construct terminal ramp and connecting taxiway.	Pave north/south runway and terminal area ramps; field lighting north/south runway and taxiways; construct entrance road and control tower; site preparation east/west runway; sanitary sewers; water line; natural gas line.	1,558,000
Los Angeles: City of Los Angeles; Los Angeles International Airport.	1,000,000	Pave taxiways, terminal apron, and holding apron.	Pave taxiways, aprons and service roads; blast fence and ducts	2,262,347
Louisville: Louisville and Jefferson County Air Board; Standiford Field.	685,000	Construct terminal building addition; construct and light taxiways.	Construct approximately 80,000 square feet of addition to present terminal building; grading, drainage, paving, etc., approximately 52,000 square yards aircraft parking apron and grading, drainage, paving, lighting, etc., approximately 5,600 by 75 feet taxiways.	860,000
Memphis: City of Memphis; Municipal Airport.	450,000	Prepare site for north/south runway, taxiway, apron, terminal building; construct free-standing tower; clear obstructions.	Site preparation for north/south runway, taxiway, apron, terminal building, and clear zone; pave north/south runway and taxiway; light north/south runway and taxiway; construct free-standing tower; construct tunnel under runway and approaches.	1,746,500

81820—58——33

CAA allocations and sponsors requests fiscal year ending June 30, 1959, for AOC members—Continued

Location, sponsor, and name of airport	Federal funds allocated		Sponsors request	
	Amount	Description of work	Description of work	Amount
Miami: Dade County Port Authority; Miami International Airport.	1,000,000	Acquire land for clear zones east/west runways and north/south runway; extend runway 9R–27L and parallel taxiway; widen taxiway serving east/west runways.	Acquire avigation easements and land for clear zones; widen taxiways to 75 feet, lengthen east/west and northwest/southeast runways to 9,400 feet, relocate road and fence; previous land acquisition; airport administration office building, add extension and 6th pier to terminal building.	$2,187,500
Milwaukee: County of Milwaukee; General Mitchell Field.	900,000	Extend north/south runway to effective length of 8,440 feet including lighting and lowering College Ave.; construct connecting taxiway and warm-up apron.	Acquire clear zones—east approaches to runways 7–25 and 13–31; extend runway 1–19R, 3,160 feet to south including connecting taxiway, apron and lowering College Ave. for approach clearance.	1,136,000
County of Milwaukee: Curtiss-Wright Airport.	115,100	Acquire land for clear zone; extent northwest end of runway 15–33R including lights; construct taxiway and warm-up pad.	Extend and light northwest end of runway 15–33R; construct taxiways and warm-up pads.	80,000
Minneapolis: Minneapolis-St. Paul Metropolitan Airports Commission; Minneapolis-St. Paul International Airport.	990,000	Construct fingers of terminal building	Construct fingers to terminal building and taxiway; storm sewer, building area and underground power line.	1,750,000
Minneapolis-St. Paul Metropolitan Airports Commission: Flying Cloud Airport.	14,000	Pave primary taxiway to hangar area	Pave east/west taxiway and alleyway	25,000
Minneapolis-St. Paul Metropolitan Airports Commission: Holman Field.		None	Install sanitary sewer and water supply	42,000
Nashville: City of Nashville; Berry Field.	650,000	Prepare site and pave parallel taxiway and bleed-offs on west side on runway 2L–20R; pave new terminal loading apron.	Land acquisition—reimbursement; construct parallel taxiway and bleed-offs on west side of runway 2L–20R; pave apron, access road, auto parking area, and service areas around and under terminal; extend and light taxiway for runway 2L–20R 1,000 feet; sewage disposal line to city system.	1,405,148
New Orleans: New Orleans Aviation Board; Moisant International Airport.	1,000,000	Construct terminal building (2d stage) and apron (northwest, west half).	Additional wiring in terminal; northwest apron (west half); terminal area facilities (street surfacing and grading); landscaping; construct phase No. 2 terminal building; east-west runway and taxiway extension; southwest apron; west apron overlay.	2,589,125
Newark; The Port of New York Authority; municipal airport.	105,000	Install lighting controls to tower; extend taxiway north.	Airport lighting control to tower; extend taxiway north; permanent access road to tower and building development area; demolition of building No. 50; terminal area expansion.	1,895,000
New York: The Port of New York Authority; New York International Airport.	1,000,000	Pave runway 4R–22L (V')	Paving and lighting of runway 4R–22L (V') and associated taxiways and piers for approach lights.	3,500,000
The Port of New York Authority: La Guardia Field.	1,000,000	Relocate runway 13–31 and associated taxiway	Extension of runway 4–22 and associated taxiways; relocation of runway 13–31 and associated taxiways; terminal building and apron rehabilitation.	14,100,000
Oakland: City of Oakland; Metropolitan Oakland International Airport.	1,000,000	Construct terminal building (additional funds)	Land acquisition; complete construction of terminal building and control tower; power and communication trunk duct lines; install water lines, sanitary trunk sewer system.	3,098,817

Oklahoma City: City of Oklahoma City; Will Rogers Field.	800,000	Acquire land for clear zones and future north/south parallel runway; extend north/south runway to 8,700 feet and extend parallel taxiway; strengthen northwest/southeast runway.	Acquire land, airport expansion and clear zones; extend north/south runway and taxiway; strengthen existing northwest/southeast and northeast/southwest runways; strengthen and widen existing taxiways and aprons; construct new aprons: addition to terminal building and passenger loading gate positions; construct airmail, air freight, and air express building road and fueling and storage facilities.	4,806,000
City of Oklahoma City; Tulakes Airport.	153,500	Acquire land for clear zones north/south and northwest/southeast runways; strengthen north/south and northwest/southeast runways and taxiways.	Acquire land for clear zones and airport expansion; strengthen existing runways and taxiways; construct additional apron and taxiways for hangar areas; new northeast/southwest runway and taxiway; utility expansion; entrance road.	650,000
Omaha: City of Omaha; Municipal Airport.	600,000	Acquire land for airport development; construct apron, taxiways, auto parking area and access road.	Construct administration building, apron, taxiways, auto parking and access road; land acquisition.	1,700,000
Philadelphia: City of Philadelphia; Philadelphia International Airport.	1,000,000	Enlarge terminal building	Construction of new parallel instrument runway, connecting taxiways and relocated railroad; removal of obstructions; land acquisition; expansion of terminal building area including construction of a pier; jet expedition taxiway to runway 9R-27L; relocation of Tinicum Island Road; modification of maintenance building.	3,609,375
City of Philadelphia: North Philadelphia Airport.	122,500	Acquire land for clear zones and approaches runway 15-33.	Acquisition of clear zones and approaches for runway 15-33	122,500
Pittsburgh: County of Allegheny; Greater Pittsburgh Airport.	1,000,000	Prepare site for new east-west parallel runway	New east-west parallel runway	1,500,000
County of Allegheny: Allegheny County Airport.		None	Extension of runway (5-23) 500 by 100 feet, and taxiway	275,000
Portland: The port of Portland; Portland International Airport.	900,000	Acquire land for clear zone; construct and light parallel runway and taxiway including obstruction removal; stabilize taxiway shoulder.	Construct and light parallel runway and taxiway; fence; stabilize taxiway shoulder; land acquisition—clear zone turfing, sprinkling and landscaping; construct shop building and pumphouse; remove abandoned pavement.	1,485,583
The Port of Portland: Troutdale Airport.	39,834	Acquire land for airport development and partial clear zone.	Land acquisition	55,940
St. Louis: City of St. Louis; Lambert-St. Louis Municipal Airport.	846,000	Reconstruct runway 6-24 from station+00 to station 11+34 and extend 2,000 by 200 feet; install high intensity lights on runway 6-24; construct taxiway and holding apron; stabilize taxiway shoulders; light taxiway.	Extend runway 6-24 and taxiway; stabilize taxiway shoulders; extend cargo building, cargo apron, and parking facilities.	1,436,000
San Antonio City of San Antonio; San Antonio International Airport.	525,600	Expand terminal building and apron; extend northwest/southeast runway to maximum intercontinental length with parallel taxiway.	Reconstruction and lengthening northwest/southeast runway (12-30) overlay 17-35 and taxiways 6, 9, 11, and 14; additional taxiways, aprons and lighting; terminal and apron extension; service roadways and utilities; cargo building.	1,188,098
San Diego: Port of San Diego; Lindbergh Field.	900,000	Construct terminal building and apron	Construct new terminal building, apron, auto access ramp to 2d level of building, auto parking area.	1,172,138
San Francisco: City and county of San Francisco; San Francisco International Airport.	1,000,000	Pave extension of runway 28L approximately 700 feet; warmup aprons for runways 28L and 28R; extend approach light support structure enlarge terminal apron; reconstruct runways and taxiways; widen taxiway shoulders; high speed taxiway turnoffs.	Extend runway 28L; reconstruct runway and taxiway; construct aprons, roads and addition to pier B; extend approach and runway lengths; widen taxiway shoulder; enlarge air cargo building; construct high speed taxiway turnouts; site preparation.	2,302,104

CAA allocations and sponsors requests fiscal year ending June 30, 1959, for AOC members—Continued

Location, sponsor, and name of airport	Federal funds allocated		Sponsors request	
	Amount	Description of work	Description of work	Amount
San Juan: Puerto Rico Ports Authority; Puerto Rico International Airport.	$950,000	Construct addition to cargo building; construct incinerator and extend utilities to incinerators; extend ILS runway to maximum IE length with parallel taxiway and lights; construct service road and auto parking area.	Construct addition to cargo building, service road, auto parking area, incinerator; extend utilities to incinerator building; extend runway 9,400 feet and parallel taxiway.	$947,500
Seattle: Port of Seattle; Seattle-Tacoma International Airport.	231,661	Extend north/south taxiway; stabilize taxiway shoulders; install new taxiway lights and relocate existing lights.	Extend north-south taxiway; construct apron, northeast/southwest runway; stabilize taxiway shoulders; additional and alter field lighting.	269,926
Tampa: County of Hillsborough; Tampa International Airport.	175,000	Strengthen and mark east/west runway and taxiway.	Resurface east/west runway; resurface taxiways; paint centerline existing taxiways; land acquisition; extend east/west runway; construct new taxistrips; new parking ramp; buildings; auto parking lot; access road; additional parking ramps and taxiways; consturct new north/south runway.	3,746,500
Tulsa:				
City of Tulsa; municipal airport	800,000	Construct terminal building (additional allocation); construct apron.	Completion of terminal area	4,000,000
City of Tulsa: Riverside Airport		None	Ramps B and C; T hangar taxiways; auto parking; terminal building; extend sewer, gas, water; fencing and curbs.	134,230
Total	29,947,170			129,085,559

Source: Prepared by Airport Operators Council from Commerce Department sources. Attachment to AOC Management Information Service No. 5, Mar. 21, 1958.

AIRPORT OPERATORS COUNCIL, INC.,
Washington, D. C., June 11, 1958.

Subject: Draft revision of TSO–N6a, "runway strength and dimensional standards for air carrier operations."

Hon. JAMES T. PYLE,
Administrator, Civil Aeronautics Administration,
Washington, D. C.

DEAR MR. PYLE: Thank you for your letter dated May 13, 1958, by which you transmitted copies of "interim TSO–N7b, a draft revision of TSO–N6a," for our review and comments. We appreciate also the fact that you personally came to Puerto Rico to deliver this draft revision at our annual meeting on May 14, and to be with us for a brief time.

As a result of the discussions by our members at San Juan and of subsequent analysis of the draft revision, we are not clear as to the basis, reasons and justification for your proposed changes. The comments that follow are for the purpose of showing why it is unclear to us and why we believe justification should be shown.

For instance, your May 13 transmittal letter states in paragraph 2 that "the fluidity of regulations affecting these [jet] aircraft, and the many variables associated with their proposed performance capabilities at this stage of their development, have added complications and new dimensions to this problem [of establishing airport dimensional requirements]."

Yet, in the very next sentence, your letter states that "based upon our studies we have concluded that across-the-board revision of previous runway length criteria is desirable, and changes have been made in respect to runway lengths in all categories of air commerce airports."

We have further difficulty in understanding this conclusion in light of the known CAA objections to the CAB's SR 422 and the more recent changes proposed in draft release 58–6. As a result of informal discussions with CAA staff it appears, however, that the basis for your proposed changes in TSO–N6a is to "make it consistent" with SR 422. We believe that the CAB in promulgating SR 422 should take into account the technical and economic impact of its provisions on airports and make it consistent with TSO–N6a instead of vice versa. We urge a much closer coordination between CAB and CAA in this regard. A copy of our letter to the CAB stating this position is attached hereto and should be considered as a part of our views on the proposed revision to TSO–N6a.

And the proposal appears further inconsistent with your jet planning progress report No. 3 which states that (p. 21) "the data now being used to establish weight and runway requirements have not been fully firmed up and are not acceptable to all concerned * * * In view of the above conditions and facts, it is quite evident that a definite fixed basic runway length at sea level, standard temperature, no wind and no gradient conditions, applicable to every airport, cannot be established * * *"

The report continues:

"Estimates which have not been substantially proved indicate that basic lengths (standard temperature, sea level, no wind, no gradient) for airport planning purposes may vary from 7,300 to 9,700 feet. The length within this range for any one specific airport will depend upon the evaluation of factors previously discussed."

On the other hand, the diagram in the report indicates that a jet transport designed to the minimum permissible performance requirements of SR 422 might require as much as 14,000 feet of runway.

And perhaps most important of all is the fact that today's DC–8's, Boeing 707, Convair 880, and Electra have all been conceived, designed, engineered and prototypes built to CAR .04b provisions as modified by the CAA and with the full knowledge and account taken (presumably) of the existing TSO–N6a which states that—

"It is the purpose of this order

* * * * * * *

"(3) to indicate to manufacturers and operators of transport type aircraft the airport runways which will be available."

Some indication of what this has meant to manufacturers and airlines are the following:

Douglas Aircraft vice president to AOC president, July 22, 1955:

"I can assure you that we have no intention of designing our transport airplanes to require longer fields at given ranges and under standard conditions

than they do now. We believe the aircraft should be fitted to the airport system, not vice versa, so far as it is humanly possible—that is, except for the improvement of substandard airports."

ATA vice president to AOC president, July 18, 1955:

"I am sure you are well aware of the fact that the airlines work closely with aircraft manufacturers in the development of transport type aircraft, and in so doing, provide a constant check on the tendency of the manufacturers to tailor the characteristics of their new aircraft types to runways 'just a little longer' than those currently in use * * * natural physical limitations to the length of runways, to our mind is the best safeguard against this thing getting out of hand * * *. We are of the opinion that TSO–N6a should be adequate for the needs of the airlines for some time to come."

United Airlines President W. A. Patterson to the Transportation Association of America, February 14, 1956:

"We realize that the day of walking into a city nonchalantly and saying 'You need a new airport' is past * * *. We see the handwriting on the wall; we recognize it and know that we have to build airplanes to fit the airport rather than to have communities build airports to fit the airplane."

And the CAA itself, together with airport sponsors throughout the country have based their airport plans on the provisions of this TSO. And quite properly so because the order also states that its purpose is—

"(1) to guide employees of the Civil Aeronautics Administration regarding approvals and recommendations for runway design, [and]

"(2) to indicate to sponsors of projects for airport development under the Federal Airport Act the present limit of runway characteristics to which Federal funds will be applied."

In conforming with this order, the 1959 fiscal year Federal airport program announced by the Administrator in April 1958 was based upon it, as were all other programs in the last 10 years. Millions and millions of Federal and local taxpayers' dollars have been invested in our national system of airports based upon the authoritativeness of this pronouncement.

If and when justification becomes known for its change, then ample opportunity should be given for careful examination of such justification. None has been provided to us to date.

Further, when millions of dollars of investment are at stake, as they are in this case, then it is only commonsense that we should have from 2 to 5 years advance notice of its effective date for planning in accordance therewith.

It was less than 3 years ago, in 1955, when we were officially advised by the Administrator that he foresaw no reason for changing TSO–N6a, and at no time in the interim have your jet age planning documents indicated that a change was either practical, desirable, or necessary.

In 1957 both the Administrator and the President's Special Assistant for Aviation Facilities Planning gave further credence to the existence and importance of TSO–N6a, when they said:

"Because I feel that we have a reasonably good national system of airports and have been enjoying the benefits of a program of Federal aid for many years, I would place airports as the final problem of the jet age" (CAA Administrator in public address to American Society of Civil Engineers, May 1957).

"There has been a decided tendency in the past to design and build maximum performance aircraft on the assumption that somehow airports will be built to accommodate them. Instead of demanding more and more concrete the designers must make maximum use of the technique like boundary layer and jet flap control to improve the takeoff and landing characteristics of our future airplanes" (address by E. P. Curtis, President's Special Assistant for Aviation Facilities Planning, January 18, 1957, to the Society of Automotive Engineers).

The untimely proposals for revising both the certification and operating regulations as well as the criteria for runway lengths places airport operators in a most difficult position.

Those airports that have relied on TSO–N6a in good faith need continued protection of their planning and investments. Those airports that have been advised by the air carriers that longer runways are necessary, however, and have tried to anticipate the runway changes which may be needed to fully implement the jet transports should not, as a result of Government delays, be penalized for their preparedness if it turns out that longer runways are actually necessary. To this end retroactive application of Federal funds to such projects needs to be considered by the CAA.

For these reasons we request—

(1) A statement of full justification and reasons for the proposed change in TSO–N6a at this time.

(2) An ample opportunity to examine and test these reasons—a minimum of 30 days is necessary from the time they are received.

(3) An opportunity to discuss with you and your staff your proposed changes and your reasons therefor after we have had time to study them.

(4) A public hearing if satisfactory results are not reached as a result of informal discussions.

Thank you very much for your cooperation in this regard.

Sincerely,

E. THOS. BURNARD, *Executive Director.*

AIRPORT OPERATORS COUNCIL, INC.,
Washington, D. C., February 8, 1956.

[Same letter to: Adm. D. C. Ramsey, president, Aircraft Industries Association, Washington, D. C.]

Mr. STUART G. TIPTON,
President, Air Transport Association of America,
Washington, D. C.

DEAR TIP: This is to confirm my understanding of the matters discussed and conclusions reached at the meeting on February 2, 1956, in the office of Admiral Ramsey, which was attended by yourself, Adm. D. C. Ramsey, president of AIA; Mr. I. C. Peterson, AIA; Mr. E. T. Burnard, AOC; and myself.

Two or possibly three conclusions appeared to have been reached:

1. There are many mutual problems confronting the aircraft manufacturers, the airlines, and the airport operators relative to the planning for jet transport service which require urgent attention and joint solutions.

2. As a first step, the three organizations concerned will, as a matter of policy, facilitate the free flow of information among them as it relates to matters which are basic to planning for jet transport service.

3. As a corollary to No. 2, the AOC and ATA, particularly, will work more closely and jointly on current mutual problems which arise out of conventional aircraft operation.

After I outlined some of the matters which we believe to be mutual problems of the aircraft manufacturers, aircraft operators and airport operators, there appeared to be agreement among us that there are a number of mutual problems on which joint action appears desirable. The two principal ones we discussed relate to community relations (particularly as affected by aircraft noise), and airport facilities (particularly as related to the new turbojet transports).

Although we were apparently in agreement that some joint action is necessary on our mutual problems, there was initially a difference of opinion as to approach on how to solve them.

I first suggested a small joint committee of ATA, AOC, and AIA. Mr. Peterson considered this undesirable and recommended that teams of individual manufacturers' representatives and individual airline representatives meet with individual airport management groups to work out the specific details relating to a specific airport with the use of a specific airplane by a specific operator. You concurred in this view.

We agreed with this view, as it related to the ultimate solution of the detailed problems, but suggested that we first exchange information which is basic and fundamental to most airports and most airlines with respect to a given aircraft. This would include the geometry of the airplane, the landing gear configuration, the turning radius, the pounds per square inch of design load per wheel, and probably the takeoff and landing requirements of the various models of the aircraft with various powerplants under standard conditions (full load, sea level, standard atmosphere, no wind, no gradient), among others.

We also pointed out that if decisions have not been made or conclusions reached on certain matters, then status reports would be useful. This might include such items as noise suppressors, jet fuel, ground handling techniques, etc.

There appeared to be agreement that an exchange of this type of information would serve a useful purpose and would not infringe manufacturers' or airline operators' trade secrets or competitive positions. Such information will greatly aid airport management in the broader aspects of airport planning.

Then, when the aircraft is certificated and operating, an airport by airport analysis should be made by the manufacturer, operating airline and airport management, to determine the precise requirements at that airport. Only after such analysis is made will it be possible for airport management to proceed with the actual construction or modification programs to accommodate the aircraft, but many precious months and perhaps years may be saved by advance knowledge of the potential scope of the projects involved.

We believe that this meeting was productive of a better understanding among us, and we trust that it will be the beginning of free exchanges of views in the future, at staff level, by committees, or by additional meetings of this type, as they appear appropriate.

In the near future, we will provide you with certain information about our airports which may be of interest to you, and will be in touch with you regarding areas of interest on the jet airplanes and their operation.

Best personal regards.

Sincerely,

ROBERT ALDRICH, *President.*

AIRCRAFT INDUSTRIES ASSOCIATION OF AMERICA, INC.,
Washington, D. C., February 14, 1956.

Mr. ROBERT ALDRICH,
President, Airport Operators Council,
Washington, D. C.

DEAR MR. ALDRICH: Thank you for your February 8th letter, commenting on the results of our recent discussion regarding jet transport operating problems.

We have reproduced your letter for dissemination to all of the interested transport manufacturers and have invited their attention, in particular, to your request for aircraft characteristics data and related information that would affect airport requirements. Any data received from the companies in response to this request will be transmitted immediately to Mr. Burnard at the Airport Operators Council for use by its members.

We will be looking forward to receiving the airport information mentioned in the last paragraph of your letter.

Very truly yours,

D. C. RAMSEY.

AIR TRANSPORT ASSOCIATION OF AMERICA,
Washington, D. C., March 22, 1956.

Mr. ROBERT ALDRICH,
President, Airport Operators Council,
St. Paul, Minn.

DEAR BOB: Reference is made to your letter of February 8, 1956, which is to confirm your understanding of the matters discussed and conclusions reached at the meeting on February 2, 1956, in the office of Admiral Ramsey and attended by yourself, Admiral Ramsey, Mr. Peterson, Mr. Burnard and myself.

First, I certainly concur that there are many mutual problems which the aircraft manufacturers, the airlines and the airport operators must face in the planning for jet service. There are areas, however, relative to the specifications of individual airplanes which, insofar as the ATA is concerned, will be difficult to provide in view of the fact that each airline's specifications for a particular model airplane varies. Sometimes this variance is concerned with maximum gross weight, fuselage length, powerplant unit and even variations with respect to the same powerplant unit. Thus, takeoff and landing requirements for the various models will vary considerably as the combination of weights and powerplant units will dictate. It will be possible only to provide the airport operators with general figures with respect to some of the airplane requirements. I certainly concur that we should do the best we can. How simple or difficult this may be, remains to be seen.

I can assure you that any information that we have which might form the basis for planning for jet transport service will be made available to your organization but I wish to caution that such information sometimes may not be

used with respect to a particular airline's operation of a particular model aircraft into a particular airport. As a matter of fact, as in the past, we will continue to work very closely with the AOC on mutual problems. We have enjoyed excellent working relations with Mr. Cy Thompson, the former secretary of AOC, his immediate successor and Mr. Burnard. This has been particularly true with respect to work accomplished in the ACC's Air Traffic Control and Navigation Panel since it was established. I am certain that on occasions in the past, as will occur in the future, there have been differences of opinion on particular issues, but looking at the picture as a whole I doubt that there has been any organization with which we have worked closer than the Airport Operators Council.

In summary, we generally agree with the contents of your letter but wish to caution against any supposition that information we may be able to provide with respect to jet aircraft will be in any way final or complete.

Cordially,

S. P. TIPTON, *President.*

[Attachment A, AOC News, September 6, 1957]

AIRPORT OPERATORS COUNCIL, INC.
August 26, 1957.

Mr. STUART G. TIPTON,
President, Air Transport Association of America,
Washington, D. C.

DEAR TIP: During past discussion and correspondence between yourself and the officers and directors of the AOC relative to obtaining the information necessary for future airport planning ,you acknowledged a real need for such information and a desire to be helpful, but an inability through the ATA to obtain or provide much useful information in this regard. You advised that airports should seek this information directly from the individual airlines because of differences between airlines in specifications of aircraft on order and differences in airline route patterns and operating procedures.

As a result of the apparent inability to obtain usuable planning information on an industry basis, and because of the great need of airports for adequate planning information, our members are submitting in the near future to each of the airlines serving their airports, a comprehensive questionnaire requesting this information. A copy is enclosed for your information.

These questions have been designed to elicit what our members consider to be the most basic planning information needed by our member airports for future development. It was prepared at the direction of our board of directors and cleared with our members.

We will appreciate very much your cooperation in encouraging the members of the ATA to conscientiously and promptly complete these questionnaires so that the fullest benefits of developments in air transportation can be realized both by the communities and by the airlines serving them.

Sincerely,

E. THOS. BURNARD,
Executive Director.

AIR TRANSPORT ASSOCIATION OF AMERICA,
Washington, D. C., September 4, 1957.

Mr. E. THOMAS BURNARD,
Executive Director, Airport Operators Council,
Washington, D. C.

DEAR TOM: Your letter to Tip was forwarded to me for action. I am enclosing herewith a copy o fthe memorandum which was forwarded by me to representatives of all of the domestic carriers who are members of ATA.

I sincerely hope that you will receive the cooperation of the airlines in this project.

Sincerely,

MILTON W. ARNOLD,
Vice President, Operations and Engineering.

AIRPORT TRANSPORT ASSOCIATION OF AMERICA,
Washington, D. C., August 29, 1957.

Memorandum to all domestic carriers.
AAXICO
Capt. Harvey M. Thompson, Allegheny Airlines, Inc.
Mr. O. M. Mosier, American Airlines, Inc.
Mr. M. W. Reynolds, Bonanza Air Lines, Inc.
Capt. R. V. Carleton, Braniff Airways, Inc.
Mr. J. B. Franklin, Capital Airlines, Inc.
Mr. R. L. Wageneck, Central Airlines, Inc.
Mr. O. R. Haueter, Continental Air Lines, Inc.
Mr. C. H. Dolson, Delta Air Lines, Inc.
Mr. S. L. Shannon, Eastern Air Lines, Inc.
Mr. Fred Benninger, The Flying Tiger Line, Inc.
Mr. E. L. Aden, Frontier Airlines, Inc.
Mr. R. W. Clifford, Lake Central Airlines, Inc.
Mr. Robert C. Tischler, Mackey Airlines, Inc.
Mr. C. A. Benscoter, Mohawk Airlines, Inc.
Mr. L. W. Dymond, National Airlines, Inc.
Mr. Alvin D. Niemeyer, North Central Airlines, Inc.
Mr. A. A. Lane, Northeast Airlines, Inc.
Mr. Wyman R. Rice, Northern Consolidated Airlines, Inc.
Mr. F. C. Judd, Northwest Airlines, Inc.
Mr. Fred E. Myers, Ozark Air Lines, Inc.
Mr. H. K. Saunders, Piedmont Airlines, Inc.
Mr. Howard R. Donalson, Riddle Airlines, Inc.
Mr. H. P. Huff, Slick Airways, Inc.
Mr. W. S. Magill, Jr., Southern Airways, Inc.
Mr. W. H. Levings, Southwest Airways Co..
Mr. Henry E. Erdmann, Trans-Texas Airways
Mr. F. D. Hall, Trans World Airlines, Inc.
Mr. D. R. Petty, United Air Lines, Inc.
Mr. E. B. Code, West Coast Airlines
Mr. S. R. Shatto, Western Air Lines

GENTLEMEN: For your information, members of the Airport Operators Council have called our attention to the fact that they have transmitted a questionnaire requesting information necessary for future airport planning. The questionnaire consists of Part A—Traffic Estimates; Part B—Aircraft Characteristics; Part C—Passenger Terminal Facilities; Part D—Ramp Area; Part E—Runways, Taxiways, and Approach Areas; Part F—Maintenance, Cargo, and Other Areas; and Part G—International Supplement. I have been requested to contact you and encourage your cooperation and assistance for the Airport Operators Council.

MILTON W. ARNOLD,
Vice President, Operations and Engineering.

AIRPORT OPERATORS COUNCIL,
Washington, D. C., February 21, 1956.

Hon. CHARLES J. LOWEN, Jr.,
Administrator of Civil Aeronautics,
Washington, D. C.

DEAR MR. LOWEN: Both at the Jet Age Conference on February 4 and at the CAA jet meeting on January 11, you and your Deputy, Mr. Joseph Blatt, indicated that the Civil Aeronautics Administration is reviewing the technical standard orders relating to airports.

Prior to your appointment as Administrator (more specifically, in December of 1954), the Airport Operators Council asked the Civil Aeronautics Administration to reaffirm its position on Technical Standard Order N6a. By letter dated May 1955, from the Office of the Administrator, we were assured that "it is not our intent to make any major changes in TSO–N6a."

In view of your more recent statements, we will appreciate being advised of (1) the nature of the requests or evidence that may have been submitted which warrants this change of viewpoint, (2) the proposed changes being considered,

(3) the procedures by which this review is being undertaken, and (4) the form, time, and place for making known to the Administration the views of interested parties.

Please be assured of our cooperation in any review that you may undertake. Since the members of this council have a very substantial interest in the outcome of such review, however, they wish to be assured of an opportunity to prepare and present their views as appropriate.

Sincerely,

E. THOS. BURNARD,
Executive Director.

7/30/58.

(No answer ever received to this letter.)

E. T. B.

AIRPORT OPERATORS COUNSEL,
Washington, May 7, 1958.

Subject: TSO–N6a.

Hon. JAMES T. PYLE,
Administrator, Civil Aeronautics Administration,
Washington, D. C.

DEAR JIM: Ever since the jet transport orders were announced by the airlines in October 1955 we have heard periodic statements from the CAA that TSO–N6a is being "reviewed."

Although we have made both formal and informal inquiries of CAA officials since that time, we have yet to be advised of the nature of the review being undertaken, nor have we been requested to sit in on any discussions or in any way given an opportunity to participate in these deliberations.

As you are well aware, technical standard orders such as N6a are used as a Bible by Civil Aeronautics Administration employees and because they are also used as a basis for approving or rejecting sponsor's requests for Federal aid to airport program funds, they are followed closely by the airport operators of the Nation and the huge investment in our national system of airports is, therefore, based to a large extent upon the standards which the Administrator promulgates.

Although we have had assurance in writing by previous Administrators that runway length criteria in TSO–N6a are to remain as they are now, the periodic statements of CAA officials to the effect that this TSO is being reviewed has given rise to our board of directors directing me to make the following official request on behalf of the Airport Operators Council:

Because of the tremendous investments involved in the major terminal type airports of this country and because any material changes in the TSO–N6a will effect these airports, you are respectfully requested that—

1. We be advised of any serious proposals that you are considering for modification of TSO–N6a, together with the basis or justification offered;

2. AOC representatives be given an opportunity to participate in any discussions on proposals (whether originated within or without the Government) for modification of TSO–N6a;

3. We be notified, before they are officially promulgated, of any official proposal to midify TSO–N6a and given a minimum of 45 days to comment thereon; and

4. We be afforded an opportunity of a public hearing in the event that there is a serious difference of opinion between our views and any official proposals of the CAA.

In other words, it its our desire to be afforded an opportunity for informal coordination on any proposals that may be seriously under consideration and secondly, in accordance with the spirit, if not the letter, of the Administrative Procedure Act to be officially advised of any proposed changes (preferably by publication in the Federal Register) with a sufficient period of time for analyzing the proposal and an opportunity for public hearing if there is a serious difference of opinion on the issues involved.

Your careful consideration of these requests will be much appreciated.

Sincerely,

E. THOS. BURNARD,
Executive Director.

ATTACHMENT NO. 1

DEPARTMENT OF COMMERCE,
CIVIL AERONAUTICS ADMINISTRATION,
Washington, May 13, 1958.

Mr. E. THOMAS BURNARD,
Executive Director, Airport Operators Council, Inc.,
Washington, D. C.

DEAR MR. BURNARD: Enclosed for review and comment by members of your organization are copies of interim TSO–N6b, a draft revision of TSO–N6a, runway strength and dimensional standards for air carrier operations.

The matter of establishing airport dimensional requirements to satisfy the needs of forthcoming air carrier aircraft has been given extensive study by the Civil Aeronautics Administration. The fluidity of regulations affecting these aircraft, and the many variables associated with their proposed performance capabilities at this stage of their development, have added complications and new dimensions to this problem.

Based upon our studies we have concluded that across-the-board revision of previous runway length criteria is desirable, and changes have been made in respect to runway lengths in all categories of air commerce airports. Furthermore, the feeder category has been eliminated from the TSO. In effect, this means that any airport which is to accommodate air carrier operations automatically will be classified, at a minimum, as a trunk airport. Studies will be pursued relative to further consolidations and reductions in the number of required service categories.

Other changes have been effected as noted by an asterisk on the enclosed draft and, in addition ,they are outlined below:

(*a*) The proposed basic runway length provides for full temperature accountability and it is necessary to correct this length only for elevation above sea level and runway gradient. The two corrections to be applied are identical to those set forth in TSO–N6a.

(*b*) Taxiway and runway widths are in conformance with advice received from those concerned with operations and handling of the forthcoming aircraft.

(*c*) Pavement strength are given in terms of equivalent single wheel inasmuch as this criterion is applicable to different landing gear wheel arrangements.

In order that we may insure comprehensive coordination of this proposed revision to TSO–N6a and have the benefit of the thinking of interested parties in this regard, we are requesting the assistance of all operational segments of the civil aviation industry. Therefore your comments on this draft are requested on or before June 12, 1958.

Sincerely yours,

JAMES T. PYLE,
Administrator.

DEPARTMENT OF COMMERCE,
CIVIL AERONAUTICS ADMINISTRATION,
Washington, July 10, 1958.

Mr. E. THOMAS BURNARD,
Executive Director, Airport Operators Council,
Washington, D. C.

DEAR MR. BURNARD: On May 13, 1958, the Civil Aeronautics Administration forwarded to your council for review and comment, a number of copies of interim technical standard order TSO–N6b, a revision of TSO–N6a, runway strength and dimensional standards for air carrier operations.

In accordance with the request contained in your letter of June 11 that we provide background information to support the increases in runway length which the revision permits, there are enclosed 13 copies of a statement which we believe will furnish the information desired.

If you have any further comments in light of this statement, either on the statement itself or on the proposed TSO–N6b, it is requested that they be forwarded to the CAA Office of Airports no later than August 1, 1958.

Sincerely yours,

WILLIAM B. DAVIS,
Deputy Administrator.

AIRPORT OPERATORS COUNCIL,
Washington, D. C., July 31, 1958.

Mr. WILLIAM B. DAVIS,
Deputy Administrator, Civil Aeronautics Administration,
Washington, D. C.

DEAR MR. DAVIS: Reference is made to your letter of July 10 by which you provided background information regarding the increases in runway length which you proposed in the draft revision of TSO–N6a of May 13, 1958.

As we stated in our letter of June 11, 1958, we will need an ample opportunity to examine your reasons and justifications for the proposed changes and indicated that a minimum of 30 days is necessary from the time they are received.

Our analysis is still not complete because of insufficient time and we, therefore, request that we be afforded the opportunity of completing our analysis and forwarding to your our comments by August 15, 1958.

Sincerely,

E. THOS. BURNARD,
Executive Director.

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